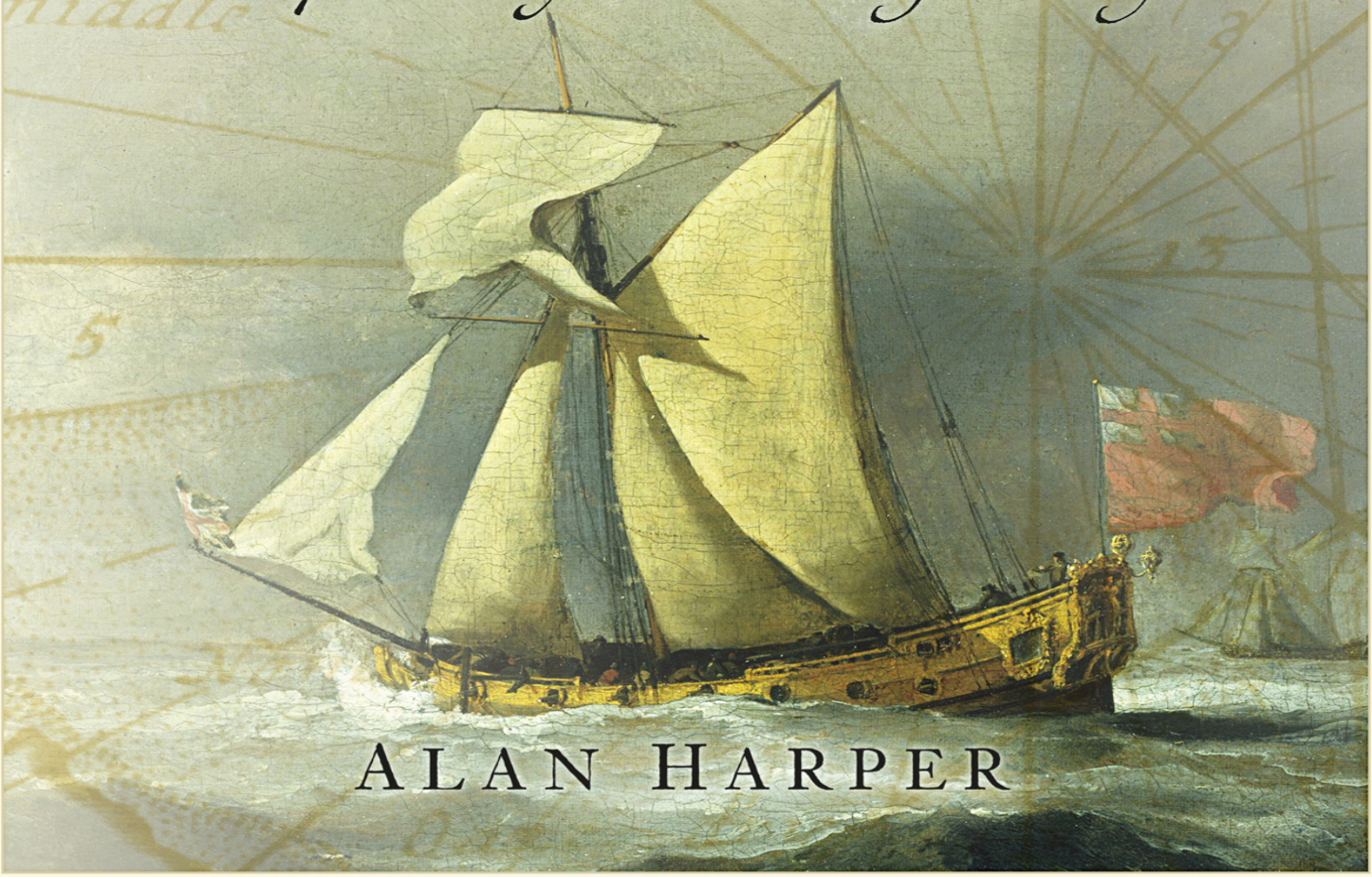
Master & Cartographer

A Life of Captain Greenville Collins, the Man who Charted Britain and Helped Change the Course of History



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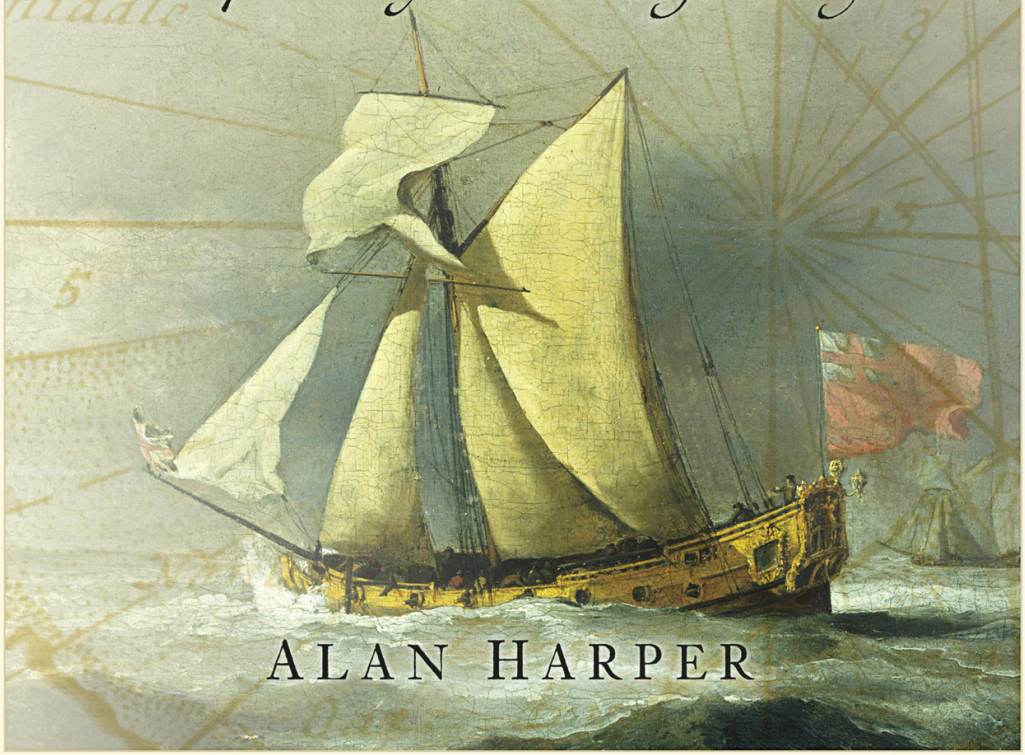

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The History Press

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Sold by Richard Mount at the Postern on Great Tower Hill LONDON

Maps. 32. c. 10.
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GREAT BRITAIN's COASTING-PILOT.

The FIRST PART.

Being a New and Exact

SURVEY of the Sea-Coast OF ENGLAND, FROM THE RIVER of THAMES TO THE WESTWARD, WITH THE ISLANDS of SCILLY, And from thence to CARLILE.

DESCRIBING

All the Harbours, Rivers, Bays, Roads, Rocks, Sands, Buoys, Beacons, Sea-Marks, Depths of Water, Latitude, Bearings and Distances from Place to Place, the Setting and Flowing of Tydes, with Directions for the knowing of any Place; and how to Harbour a Ship in the same with Safety.

With Directions for Coming into the CHANNEL between *ENGLAND* and *FRANCE*.

By Captain GREENVILE COLLINS *Hydrographer in Ordinary to the* KING *and* QUEENS *most Excellent Majesties.*

LONDON:
Printed by *Freeman Collins*, and are to be Sold by *Richard Mount* Bookseller, at the *Postern* on *Tower-Hill*. 1693.

The opening pages of the magnificent ‘king’s copy’ of Collins’ sea atlas, an early impression of the original 1693 edition. (British Library)

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For Lewis and Sean, in memory of their grandfather, Robert Harper (1928–2009), who made it seem normal to have an Admiralty chart spread out on the dining room table

Cover image: *The Cleveland Yacht at Sea in a Fresh Breeze*, Willem van de Velde the Younger. (Alamy, The Print Collector/Heritage Images)

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Of course I owe the biggest thanks of all to my wife Gill, for everything.

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Portsmouth Harbour and the Isle of Wight (detail) by Waghenaer, 1586. (Arader Galleries)

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Prologue

Weatherbound in Gosport

> *Bring the small village called Ryde by the Sea-side on the Isle of Wight, to bear WSW and Gilkicker NW, then you may anchor in the best of the Road, at the Spithead, which is a very good Road, and clean Ground, where the Royal Navy many times ride*
>
> *Greenvile Collins, Great Britain's Coasting Pilot*

Old logbooks can be rather arid affairs, offering no more than a simple record of the pertinent facts – position, heading, course and speed – and maybe some gnomic observations on the weather. My own are no exception:

HW Standard Port: 0839, 4.1m
HW Local: 0907, 4.2m
Weather: Fine, NW 3/4

But these dry notes do serve to jog the memory. It was some time ago, but I remember spending that October day moving a boat for its owner from Chichester Harbour to Gosport, just a short hop along England's south coast, where I was to pick up some crew for an onward trip down to the West Country. They were coming down to Portsmouth on the train after work, and the plan was to catch the harbour ferry to the Gosport side, drop their bags on the boat, and within a few minutes we would be in the Castle Tavern. Later, maybe a curry in the New Bengal, if we could remember where it was.

At the West Pole beacon, I glanced down at the chart to remind myself of the pencil line I had drawn on it earlier that morning:

1104: West Pole, log 486nm, course 264°M

I was obviously going to be in Gosport rather earlier than I needed to be, but the timing was determined by the depth at the entrance to Chichester Harbour. There was still plenty of water when I crossed the bar about two hours after high tide, but I hadn't wanted to leave it later than that. The Admiralty chart told the story, with its expanses of shallows in pale blue, and plenty of green, too, showing areas that dried out altogether.

Emerging into open water, I knew to expect a slight west-going tidal stream. South-east lay the low, sandy promontory of Selsey Bill, and to the south-west, a similar distance off, the high downs of the Isle of Wight. The sea was calm, and apart from the sands off Langstone there were no off-lying hazards to worry about, apart from man-made ones. With the tide falling, I elected to go around the sea fort, rather than cut inside.

1136: Horse Sand Fort, log 493nm, course 331°M

I left this towering Victorian edifice close to starboard and turned in towards the buoyed channel leading up towards Portsmouth. The ebbing tide was gathering pace as it funnelled through the narrows.

1152: Harbour entrance

The harbour was busy, as always, with vessels large and small, freighters, fleet auxiliaries and pilot launches zigzagging across the choppy waters as pleasure craft meandered between them. Small ferries arrived from the Isle of Wight as large ones set off for France, watched over by the tall masts of the Royal Navy's museum ships, *Victory* and *Warrior*, and by the more

businesslike antennae of their successors, lying alongside the quays of the naval base.

In the morning, we awoke for the 05.20 weather forecast to find that yesterday's prediction of 'NW 3/4' was today's 'SW 4/5, increasing 8', which meant strong winds right on the nose for anyone heading west – a daunting prospect for a small boat on what was already turning out to be a grey and rainy day. It was an easy decision to stay put and wait to see if things improved.

Being weatherbound isn't all bad. I have been happily detained in picturesque Cornish ports while waiting for a gale to blow through, getting soaked rowing ashore and dashing between pubs in driving rain. St Peter Port in Guernsey is another bolthole where yachtsmen linger long after they are due back in the office. In places like Salcombe and Milford Haven, when it's too rough to venture out, you can take the tender on day-long explorations of the tidal creeks and backwaters.

Gosport was rather lacking in such picture-postcard charm, thanks to the cumulative effect of naval housing, German bombs and Sixties town planning. But there were cafés, and a submarine museum, and a choice of pubs for lunch. While sheltering from the rain in a dark and musty antiques shop, I discovered among the tarnished binnacles and mildewed prints an ancient-looking nautical chart of Milford Haven. As I had taken a boat in there just the previous summer, it immediately seemed familiar. The outline of the estuary looked pretty accurate, albeit with no oil refinery or docks. There were no latitudes or longitudes either, but I did notice a mileage scale in the bottom right corner, and a compass rose bottom left, north-up and radiant with rhumb lines. A small coastal profile at the top advised: 'These hills show at Sea'. Creeks on both sides of the long natural harbour were rendered behind drying mudbanks, and a rocky spit was marked with a half-moon, indicating that the hazard only showed itself at half-tide on the ebb. Hillsides were clad with trees, and in the place where I remembered gazing up from the dinghy at a concrete road bridge, a dotted track stopped at the water's edge, labelled 'Pembrok Ferry'. Soundings were evidently in fathoms.

Everything about this chart looked old, and yet it wasn't some fanciful confection decorated with sea monsters and blowsy galleons, but a serious work of hydrography which I would have been perfectly happy to use myself, as long as I remembered to keep an eye out for oil tankers. The elaborate cartouche attributed it to 'Capt Greenuile Collins, Hyd. To ye King'.

The antiques dealer explained that it was originally bound into a large sea atlas. He dated it to the late seventeenth century. It wasn't too expensive, so I bought it.

If Greenvile Collins is known at all today it is for his sea atlas, *Great Britain*'s *Coasting Pilot*, a hefty, two-handed tome that contains more than forty charts, along with numerous engraved coastal views showing what various headlands and harbours look like from the sea, and many pages of detailed sailing directions. It came out in 1693, and has come to be regarded as the founding monument of British hydrography.

Collins' charts retain much of the charm of an earlier age of map-making, with houses, churches and castles drawn in profile, and woods and forests rendered with individual trees. Allegorical figures do their duty in the corners: on my Milford Haven chart a blindfolded Justice dangles her scales over the distance scale, observed by a rum-looking cove in a frock coat rattling a key and some chains. In the cartouche surrounding the dedication, a quartet of cherubs cavort with miscellaneous fish and livestock.

In spite of such Baroque embellishments, as navigation aids Collins' charts can look remarkably modern. There is little that is superfluous. Beyond their cartoon towns and trees, the land is blank, except where it offers something useful to the navigator – a conspicuous windmill from which to take a bearing, perhaps, or a prominent peak that would be visible from many miles away. The low-tide extent of the foreshore is shown as

stippled dots, while deep water is clear except for soundings. Anchors indicate suitable places to moor, rocks are engraved as little crosses, transits and clearing lines help with planning tricky approaches through the shoals. This is the information navigators need. These charts were not intended for the landowner's library or the collector's wall. Collins made them to be used. And bound into the atlas alongside the charts, his columns of pilotage notes went into great detail in their densely printed folio-size pages.

Any creative endeavour is a work of the imagination, and in map-making it's a two-way street – the cartographer and the viewer must both bring their imaginations into play and agree, if they can, that the marks on the paper represent some recognisable reality. In the earliest maps the nature of that reality often seems very much up for debate, being less a rational exchange than a shouted conversation between drunks, but by medieval times map-makers were beginning to work out how the real world might be represented on a flat plane, and how much additional information might be included without making it too much of dog's breakfast. By the sixteenth century, printed maps and charts were being produced that are easily recognisable to the modern eye. A century after they were published, the sea charts of Dutch cartographer Lucas Janszoon Waghenaer were still widely used and plagiarised in Collins' day, and his name, anglicised to 'Waggoner', had become a synonym for any sea atlas. His charts were valued for their soundings, rhumb lines, coastal profiles and, on some, their scales of latitude and longitude.

But these were merely gestures towards a truly scientific approach. It was the quality of the original surveys that let Waghenaer's charts down, resulting in coastal outlines that verged on the fanciful, as anyone who actually used them at sea would soon discover. Waghenaer and his contemporaries also held true to the ideal that maps should be decorative as well as functional. White space was a waste of good copper. In a confusing salad of foliage and spouting whales, the primary role of the chart as an aid to navigation could easily get lost, along with the navigator.

Greenvile Collins' imaginative strength was to put himself in the position of the man on the spot – the ship's master, peering at the chart by

the light of a candle, or squinting into the spray on a dull morning, unsure of his position, trying to identify a distant headland dimly showing itself between the squalls. His needs were pressing, but simple – just the facts. Collins used his imagination so the navigator didn't have to. Collins knew. He had been there himself.

Today, for all their graphical clarity, topographical discernment and admirable engraving, Collins' charts seem appealingly hand-made. Their paper is thick, creamy and textured. Their quality varies widely, from crisp early impressions to fuzzy late editions pressed from worn-out plates. There was plenty of wear: his *Great Britain*'s *Coasting Pilot* remained in print, with additions, amendments and occasional re-engravings, for nearly a century.

It was the first time that a coherent effort had been made to survey the whole British coastline in a way that would be of practical use to mariners. The idea was championed by Samuel Pepys, Secretary to the Admiralty, who found it insupportable that British sailors, in their own waters, had to use Dutch charts, or copies of them. King Charles II agreed, although neither man had much idea of what they were actually agreeing to: 'With so little knowledge in England at the time of what surveying entailed, those who commissioned the work had no conception of the magnitude of the problem,' one later hydrographer wrote. 'For it must be remembered that there was no land survey worthy of the name which Collins could use as a basis for his work.'[1]

Nevertheless, over numerous successive summers and under three consecutive kings, Collins was given command of various royal yachts in which he surveyed the coastline from Shetland to the Isles of Scilly, along with much of the east coast and the Irish Sea. It was a phenomenal achievement undertaken in a remarkably short time, and it was largely a solo effort – although of course he did command a twenty-strong crew to help sail the yacht, row the longboat, heave the lead, and haul the measuring chains.

His work was by no means perfect. His latitudes can be rather vague. He didn't bother with longitude, as it was impossible back then to measure

it at sea with any accuracy. In most of his charts it is easy to find errors, and on some you can find the occasional howler. Even modern sailors who know nothing about him have heard about his erroneous latitude values for the Scilly Isles, which have sometimes been held responsible – quite wrongly – for the infamous wreck of the *Association* and three other naval vessels there in 1707. As we will see, that disaster was caused not by Collins' hydrography but by an admiral's stupidity.

For all their imperfections, Collins' charts were an enormous improvement on what had gone before, and a major advance in the science of coastal surveying. In today's United Kingdom Hydrographic Office, famous throughout the maritime world as the publisher of UK Admiralty charts, he is regarded as the patron saint of British hydrography. 'Having some knowledge of the primitive methods available to him, [we] have to admire the clear drafts and concise directions for entry into the many ports and harbours around our shores,' wrote one of his twentieth-century successors.[2] And as a recent UKHO publication put it: 'Greenvile Collins is looked upon as the first full-time professional hydrographic surveyor in the modern Royal Navy,' and his *Great Britain's Coastal Pilot* was 'the first attempt at a national hydrographic survey of Home Waters'.[3]

Collins' charts show an indomitable determination to make something of real value for his fellow seafarers, and they set the standard for the hydrographers who followed in his wake. His place in history would be assured even if the *Great Britain*'s *Coastal Pilot* was the only thing he left behind. But it wasn't.

About Greenvile Collins the man we don't know very much. The records show he was baptised in the Devon village of North Tawton in 1643.[4] His family had associations with the city of Exeter, and were pretty well-to-do – his grandfather was an apothecary, and his father studied at Oxford.[*] They were loyal to the Royalist cause during the Civil War. He had a brother

named Gilbert who died as an infant, and another brother, James, who became an engraver in London and would later work on some of the charts. The first printer of *Great Britain*'s *Coasting Pilot*, Freeman Collins, was their cousin. Greenvile's marriage was recorded in the parish register at Westminster in 1679, and he and his wife Elinor later moved to Deptford. They had eight children.

And that's about it.

But about Greenvile Collins the navigator, hydrographer and naval warrant officer, we know quite a lot. It has been suggested that he was named after local hero Sir Bevil Grenville, who was killed during the Civil War at the Battle of Lansdowne, near Bath, shortly before Greenvile was born.[5] But he could as easily have been named after Sir Bevil's grandfather, the Elizabethan admiral Sir Richard Grenville of the *Revenge*, just as little Gilbert was perhaps named after Sir Humphrey Gilbert, another murderous Devon naval celebrity. Either way, Collins grew up in an area steeped in stories of the sea, of Drake and Raleigh and the Spanish Armada, and he seems to have answered its call while still a teenager.

The written records have little light to shed on his early seagoing career. There is one reference to a Far Eastern voyage that he undertook as a young man, [6] which would have probably been with the East India Company. It has also been suggested that he served with the Royal African Company,[7] and although there is little in the way of a paper trail, it does seem certain that he sailed on Sir John Narbrough's voyage south, through the Straits of Magellan and into the Pacific, from 1669 to 1671.[8]

The first documented sighting we have of Greenvile Collins in the archives places him aboard a king's ship in March 1672, when at the age of 29, his name appears in the paybook of the *Triumph*,[9] a distinguished but elderly second rate of seventy-two guns. He held the rank of master's mate. The master was the senior warrant officer on board, responsible for sailing and navigating the ship, and as his subordinate Collins was on the promotional ladder, learning on the job.

Within two months of Collins signing on, the *Triumph* was in action against the Dutch in the North Sea at the Battle of Solebay: a bloody,

chaotic and inconclusive melee in which hundreds of ships were involved, and thousands of men were killed or wounded, including virtually the entire complement of the Duke of York's flagship, the hundred-gun first-rate *Royal James*, which was burnt to the waterline. The future King James II fought his fleet tenaciously, twice shifting his flag to other ships during the battle. The *Triumph* got off relatively lightly, with six wounded and ten killed, including her commander.

After the battle, Captain Charles Wylde took temporary charge of the *Triumph*, and wrote in his account of the action:

> About 12 noon we tacked and stood to the Eastward, having a hot and bloody fight without any cessation … About 2 afternoon we passed to leeward of the Royal James, she being fired, having 3 fireships by her and one of them aboard on her larboard quarter, the Lord grant his Royal Highness his life and our fleet better success.

With the unbowed bloody-mindedness that would come to characterise the Royal Navy in centuries to come, at least in the stories that it likes to tell about itself, the sorely battered English fleet ended the day chasing the Dutch to the east-south-east until fog descended and masked them from view. Offensive patrols continued. A few weeks later, in 17-fathom water within sight of the Dutch coast, her anchor dragging in stormy weather, the *Triumph* had to veer out nearly 600ft of cable before it finally held, 'and we rode safe'.[10]

Such were the formative experiences of a young master's mate. The Anglo-Dutch wars of 1652 to 1674 saw numerous sea fights and skirmishes, and an extraordinary number of major fleet engagements involving virtually the entire navies of both sides. If Collins remained aboard the *Triumph* after 1672 – and it seems probable that he did – then Solebay was not his only taste of battle in the Narrow Seas. The experience was to stand him in good stead.

Four years later we finally get to meet him properly. By May 1676 he had passed his master's examination at Trinity House and been appointed to a ship. Captains, lieutenants and masters in the Stuart navy were required to keep professional journals and submit them to the Admiralty after each voyage,[11] and no fewer than four of Collins' journals have survived. A naval journal at that time was a pretty substantial piece of work, comprising daily entries written up in fair copy from notes taken over a period of months, or years. Their contents varied according to the responsibilities, interests and education of the writer, and range from terse, matter-of-fact daily statements of account – position, heading, distance run – to detailed travelogues complete with maps and drawings.

Collins' journals are both. As the master of the ships he served in, responsible for their navigation and handling, he naturally included every detail relevant to where they were, where they had come from, and where they were trying to get to. A journal written by the master of one of His Majesty's ships would also, of course, be expected to present information that could be of practical use to his fellow officers, such as the position of a newly discovered rock in a Spanish anchorage, pilotage notes for an unfamiliar port, or a good place to find fresh water.

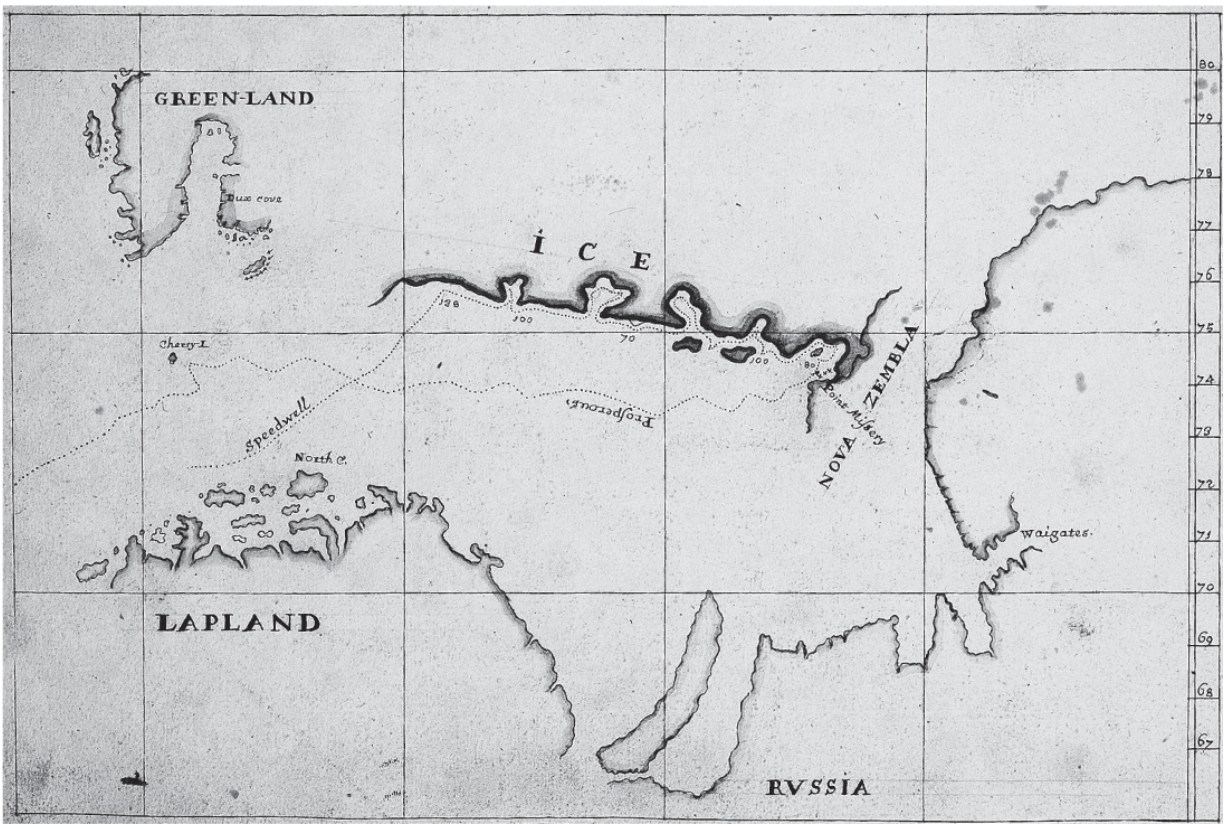
But while the journals of some of his contemporaries suggest that they were trying to get away with the bare minimum that would satisfy the pen-pushers at the Admiralty, Collins wrote as much for himself as for their lordships. He can be seen dutifully measuring the direction and rate of some new current that seems to be pushing his ship off course, or sounding the depths in an unfamiliar anchorage, but then his next entry might include a sketch of an exotic sea creature, a description of a curious atmospheric phenomenon, or an estimate of the circumference of Vesuvius' crater. He was not just an excellent navigator. He had a scientific curiosity that extended beyond the requirements of his trade. He was interested in everything, and in eighty thousand words and 350 folio-size pages across the four journals, he did a pretty thorough job of getting it all down.

The voyages Greenvile Collins recorded in these big leather-bound volumes took him from the high latitudes of the Arctic to the sunbaked

shores of North Africa, and from the muddy slipways of Deptford Dockyard to the slave markets of the Ottoman Empire. There was a year-long cruise with King Charles' teenage son as his pupil, with Collins teaching the boy the rudiments of navigation and seamanship while shepherding merchant ships to Smyrna, exploring Naples and investigating ancient ruins. The longest journal is an account of three years of convoy escort and offensive patrols as part of the navy's fledgling Mediterranean fleet, when he conned his frigate into a ferocious engagement with an Algerian privateer, surveyed numerous harbours and anchorages and was promoted from ship to ship until he found himself aboard Sir John Narbrough's flagship, navigating for the admiral himself. Earlier, on an Arctic voyage that ended in shipwreck, he had wondered at the walruses and polar bears, watched his captain defuse an incipient mutiny, and somehow managed not to lose his notes.

Finally, with England facing an invasion from Holland, he was chosen by the Admiral of the Fleet to serve as navigator aboard the navy's flagship. The Catholic James II seemed intent on overturning 150 years of English Protestantism. Few of his subjects agreed with him, and for Collins it would have seemed like forsaking the clear, spare asceticism of his own elegant charts for the spouting whales and foliage of an earlier era. The Glorious Revolution was a turning point in the history not just of Britain but of all Europe, and as master of the *Resolution* Collins was at the epicentre of its intrigues, deceptions and conspiracies. Like the king's faith in Catholicism, the admiral's faith in Collins was absolute, and it led to his undoing. Collins' interventions helped to ensure the navy's failure, and the revolution's success. It can truly be said that he helped change the course of history.

Collins made his mark. *Great Britain*'s *Coasting Pilot* illuminated the shores of the kingdom more sharply than anything seen before, and his journals shine a light on the man behind the maps. He lived during a time of extraordinary tumult, and left the world a very different place.



The track of the *Speedwell* and *Prosperous* along the ice sheet, from Collins' Arctic journal. (Arader Galleries)

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* At Wadham College, which was founded to educate deserving young men from the West Country. The Wadham family owned the manor of South Tawton, which is 10 miles from Collins' birthplace. [https://en.wikipedia.org/wiki/William_Wadham_(died_1452)]

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1

Polar Bears are Delicious

His Majesty was pleased to acquaint their Lordships with his purpose of sending a 5th-rate ship at his own charge for the discovery of the North-East Passage, invited thereto by the discourse he had lately had on that subject with Captain John Wood.

Minutes of the Admiralty Commission, 11 March 1676 [1]

It was four in the morning, when the dazzle of the rising sun would have been just starting to show itself through the mists blanketing the Essex marshes, three points north of east. Topmasts of the surrounding ships began to glow in its warmth, then lower masts, and then the sunlight touched their decks, and it was day.

The tide was near its height, and His Majesty's Ship *Speedwell* was preparing to depart from its mid-river moorings at Deptford, 4 miles downstream of London Bridge. From his elevated vantage point on the poop deck of his admittedly quite small vessel, her captain, John Wood, would have just been able to see over the timber embankment of the sleeping royal dockyard on the south side. To the north, the muddy foreshore of the Isle of Dogs. Nothing much to look at there.

Wood's master, Greenvile Collins, was busy supervising the crew as the stern mooring line was cast off, allowing the little fifth rate to swing slowly on the shortened forward line, pointing her bow downriver into the last of the incoming tide. It had been slackening this last hour, and now it ceased. It can be quite sudden, the turning of the tide, as the flotsam, bits of wood

and floating filth that sully the surface lose interest in their lazy drift towards the city and simply stop. After a few minutes, almost imperceptibly, they are in motion again, going back towards the sea.

On a nod from the captain, Collins ordered the foredeck hands to cast off, and as the thick hemp hawser splashed into the river, the topmen let the sails fall. On his platform below the quarterdeck the helmsman stood ready for orders from the master, the whipstaff in his hands connected to the tiller beneath his feet, his view restricted by the short, protective deckhouse that framed his head and shoulders like a cowl. With the tide under her and the wind steady, the *Speedwell* began her progress down the Thames, gliding past the fields and gardens of Greenwich, where the handsome white Queen's House shamed the crumbling, red-brick remnants of the old Tudor palace, and up at the top of Castle Hill, overlooking the great curve of the river, the scaffolding would soon be coming off the king's new astronomical observatory.

Collins would have stayed close to the helmsman in these confined waters so that they could hear each other, the one with the conn and the other on the tiller. It may have been early in the day, but the life of this busiest of waterways was ruled by the moon, not the sun, and plenty of other vessels were starting their journeys downriver as the ebb set in and gathered pace: coastal barges, trading pinks, packets, fishing boats and the ceaseless oar-powered two-man wherries, which needed to be watched due to their tiresome habit of cutting corners to speed their journeys. Empty colliers in ballast would be heading out into the North Sea and up the coast to fill their holds in Newcastle, while merchant ships of all shapes and sizes would be making for the Downs, there to join with other outward-bound ships awaiting a naval escort: French and Dutch privateers may no longer have been a threat, but Algerian slavers were still sometimes seen in the Channel. You couldn't be too careful.

The *Speedwell* ghosted northwards, even slightly west of north going up Blackwall Reach, with the topsails sheeted home. Coming level with the point, the hands let the spritsail fall from its yard right forward, squared the main topsail and watched as the bow began to pay off, easing the sheets as

the wind came aft and the helmsman cleared the inside of the bend. It was the last tight turn in the Thames, which at high water was not as wide as it looked. It wouldn't do to be stuck on the mud on a falling tide – not in such a public place. Once past Blackwell Point the river began to straighten out, the yards were trimmed round on to the starboard tack, and the crew could relax.

Crouched in his cupboard-sized cabin tucked under the poop, Greenvile Collins, the *Speedwell*'s 33-year-old master and navigator, opened his new journal and inscribed the astrological symbol for Saturn, ♄, in the date column. For it was a Saturday, 6 May 1676: 'Set Sayle from Debtford, and fell down into Long Reach.'[2]

England was at peace, and broke. Expensive altercations with the Dutch had become habitual since the Civil War, fuelled by maritime rivalries between the two nations. Three naval wars had sprung up since Cromwell's Commonwealth had built or refitted some seventy-seven ships and challenged the Dutch for supremacy in the Atlantic, the Mediterranean and the Narrow Seas. Cromwell's naval commanders, in particular Robert Blake, got the better of the Dutch more often than not, but in the second and third bouts, after the Restoration, it was usually the Dutch who prevailed – although not without the occasional reverse.

Hostilities between England and the Dutch Republic finally came to an end in 1674, with the signing of the Treaty of Westminster. But the Dutch and French were still at each other's throats, so while his great naval rival was otherwise engaged, King Charles II took the opportunity to review the economic prospects of his kingdom. One way of keeping it afloat was to accept subsidies from richer neighbours in return for diplomatic or military co-operation, and Charles had in fact been on the French payroll, secretly, since 1670. But he also knew that for an island nation a surer way to wealth and prosperity was through seaborne trade. One of his first acts when he

was restored to the throne in 1660 had been to establish the Royal African Company, overseen by his brother James, Duke of York, which traded in gold, ivory and, increasingly, slaves. The Levant Company had been granted its royal monopoly back in Queen Elizabeth's day, and was active in the Ottoman ports of the eastern Mediterranean, exporting English products like woollen cloth and pewter, and bringing back raisins, pepper and nutmeg as well as such luxury goods as silk and porcelain that had made their way overland from China and Japan. And while England's East India Company was prospering, having eclipsed the Portuguese on the sub-continent, it wasn't prospering quite so conspicuously as its rival, the Dutch Republic's *Vereenigde Oostindische Compagnie*, or VOC, which was cutting out Ottoman middlemen by dealing directly with the merchants of the Far East. The Portuguese were at it, too.

So, just as the Spanish in an earlier age had sent Columbus westwards to forge direct trading links with the great eastern empires, Charles sought to do the same by sending a fleet to the north. It was obvious. Although China and Japan were on the other side of the world, with the merest glance at one of Mr Moxon's globes, any fool could see that the shortest route from England to the riches of the Orient was via the Arctic.

It was a small fleet, just two ships, for an exploratory expedition. No one knew whether a viable northern route even existed, although both the English and the Dutch had been investigating the icy waters of the far north since the previous century. The *Speedwell* was financed by the king, and her consort, the *Prosperous*, had been purchased for the voyage by the king's brother James, Duke of York, and a consortium of wealthy speculators, including Samuel Pepys. The famous diarist knew a good thing when he saw it. His sharp intelligence and analytical cast of mind gave him a genius for administration, but he also possessed the avaricious instincts of a career criminal, and since his appointment to the Navy Board, which oversaw the king's ships, shipbuilding and the royal dockyards, he had grown rich.* In this Arctic adventure of the king's, he saw an opportunity to grow richer.

Commanded by the senior captain, John Wood, the bigger of the two vessels was a fifth rate of twenty-six guns, launched twenty years earlier at

Deptford dockyard as part of a fourteen-ship build programme for ‘nimble frigates’. She was originally known as *Cheriton*, after the Civil War battle, but along with many other Commonwealth-era ships she was renamed on Charles II’s succession. Measuring 76ft along her keel – making her about 95ft overall, excluding her bowsprit – with a beam of 24ft and drawing 11ft at the stern, she had a peacetime complement of eighty officers and men,[3] although for this voyage she sailed with a crew of seventy-four. The *Speedwell* would have been a handsome vessel, ship-rigged, with square sails on the main and foremasts and a triangular lateen at the mizzen beneath a square topsail. Her timbers had been strengthened for the voyage and her hull sheathed in protective lead.[4]

The *Prosperous*, commanded by Captain John Flawes, was a smaller ship of a type known as a pink. Little is known about her. She was an armed merchant vessel, described by Wood as 120 tons and fitted out with ‘Men, Ammunition, Provision, and Merchanidize, which was such as was reasonably propos’d to vend on the coast of Tartaria, or at Japan, if a Passage had been found.’[5] Flawes was of the king’s navy,[6] but her other officers were merchant sailors who had to be given naval warrants for the duration of the voyage.[7] A pink was a coastal working craft, and the *Prosperous* could have been Dutch-built, and therefore double-ended, with a square rig, leeboards and a relatively shallow draught so she could work among the mud and sandbanks in the southern North Sea. She would have been a tubby and rather stolid sailor, but robust and dependable, built for load carrying rather than speed.

Samuel Pepys took a close interest in the preparation of both vessels. He was excited by the voyage’s prospects, which were potentially very lucrative. At one point, no doubt musing on how to maximise his returns as an investor, he suggested that rather than lining the bread room of ‘our pink’ with expensive tin, they could use some of her lead hull sheathing instead. Also, he had recently met an unemployed merchant captain who, he felt, looked ideal for the role of master aboard the *Speedwell*. This Mr Golden had sailed several times to the Indies, apparently, but had fallen out with his employers and seemed a bit desperate – so he would probably be

cheap. Unfortunately, he was also an alcoholic. Pepys felt sure that ‘Captain Wood will easily find means of keeping him sober’,[8] but Wood demurred. Wood knew Collins, and he wanted Collins. He got his way when the king, on showing the drunken sailor a polar map during the job interview, discovered that he could not distinguish east from west.[9]

The *Speedwell* anchored in Long Reach, just downstream of Dartford Creek, and lay there between the Kent mud and the Essex mud to wait for her consort. For Wood, her captain, and Collins, her master, their situation called to mind an earlier voyage of discovery in which they had both taken part.

Seven years before, another king’s ship, the *Sweepstakes*, and another pink, the *Batchelor*, had also been sent out from the Thames by the king, this time under the command of Captain John Narbrough. It was an expedition to the south, with a view to rounding South America, penetrating the Pacific, and perhaps investigating the possibility of a northern route back to Europe between America and Asia. John Wood served Narbrough as master of the *Sweepstakes*, and Greenvile Collins had signed on as master’s mate.

Provisioned for fourteen months, they set sail in late September 1669. Off the coast of Argentina, the two ships became separated, and they never saw the *Batchelor* again, but Narbrough pressed on. By the middle of October, the *Sweepstakes* was making her lonely way into the Strait of Magellan. Required as were all naval officers to keep a journal of his voyage,[10] Narbrough had been briefed by none other than the Duke of York – James, the king’s brother, was Lord High Admiral – ‘to make a discovery Boath of the seas and Coasts in that parte of the world’. That meant coming back with sketches, charts and plans, augmented by whatever information could be gleaned, whether ethnographic, geographic, or hydrographic.

Intelligence of any sort could further the imperial and strategic ambitions of the Crown.

The king had chosen his captain well. John Narbrough was not a gentleman officer but a 'tarpaulin' – a seaman who had come up through the ranks, without preferment, earning his promotion on merit.[11] He was from Norfolk, and originally went to sea as a cabin boy. He made lieutenant in 1664 and captain two years later, had seen plenty of action against the Dutch, and would eventually be knighted for his heroism in battle. Still only 29 when the *Sweepstakes* set sail, he had been at sea most of his life and had clearly been marked out as one to watch. For Greenvile Collins he was to prove a mentor, and an inspiration.

Narbrough's journal[*] also reveals him to be a born explorer, a natural philosopher and an officer of humanity and intelligence who not only possessed a scientific knowledge of his work, but also understood the principles of leadership. 'Today the Cooper found two Buts of Beer had leaked out: this day all of us drank water only,' he wrote on 7 December, off the coast of Patagonia. 'It was ever my order that the meanest Boy in the Ship should have the same allowance with my self … I never permitted any Officer to have a better piece of Meat that what fell to his Lot.' The rating who served out the food wore a blindfold, so no one was favoured, and everyone took what they were given.

On Christmas Eve, Narbrough was puzzled to find that they had sailed further than he thought they should have: 'I find I have gone more Southerly by 12 miles than the Log allows,' he wrote. 'I can't perceive any variation, and the log is well kept, and the half minute Glass good; I judge the Current sets to the Southward, now the winds are in the East, and the Moon near full.' The speed of a ship was measured by trailing a length of light twine over the stern, which was knotted every 50ft or so and attached to a specially shaped piece of wood – the log. A thirty-second hourglass was turned as the wood hit the water and the number of knots that ran off the reel in that time was their speed through the water. In this case, the water was moving too, helping them along. Narbrough noted the fact.

A week later he calculated magnetic variation using his azimuth compass, measuring the sun's amplitude at sunrise and sunset to find true south – amplitude being the difference between the bearing of the sun and the bearing of east and west – and comparing it with where the compass was pointing.[†] Observing that the southern hemisphere lacked a helpful polar star to help with navigation, he offered a method by which the Southern Cross could also be used to find true south.

On they sailed. To a seventeenth-century seaman the natural world was mainly a source of food, and Narbrough knew how to keep his crew healthy. But it also clearly delighted him. He noticed everything. The journal is full of fish and birds of species new to a northern eye. The 'numberless' seals were a wonder. 'The Penguin is a Fowl that lives by catching and eating of Fish, which he dives for, and is very nimble in the Water,' he wrote. 'They are short legged like a Goose, and stand upright like little Children in white aprons, in companies together.' He had brought his greyhound, and took it out hunting for hare and guanaco.

The people they encountered were fearful, suspicious, and hard to reach. They showed little interest in trinkets and trade goods, and stole things. For Thomas Hobbes they would have provided living proof of a brutish 'state of nature', but Narbrough's view was more nuanced and humane: 'These People must certainly have received some Injury in former times,' he decided, 'from some People that have been here in Shipping, otherwise they would have come in sight of us; or else they have heard of the cruel dealings of the Spaniards towards the Indians.' One day out walking they found 'the form of a Ship in Earth and Bushes, and stuck up pieces of Sticks for Masts'. It was the size of their pinnace, about 25ft long. 'I suppose they made it in memory of our being there … for they have no other way to record but by imitation.' Uncomprehending, he was nevertheless respectful: 'We left it alone untouched at our coming away. I left beads and other small trinkets at it, hanging to the ensign staffe.'

Narbrough's journal was published a few years later. It reads like Defoe.[*]

When it came to the hydrographic side of his task, drafts of Narbrough's manuscript charts showed depth soundings, landmarks and annotations that would be essential to any navigator who followed in his wake. His beautiful harbour charts of St Julian, Port Desire and Valdivia also contain narrative elements, showing where the ship spent the winter, and where the crew foraged for food and fresh water. They include numerous sketches of the birds and beasts, and one showing how the local people were dressed.[12]

Once in the Strait of Magellan he worked quickly, often surveying from on board the ship as he passed the coast, using running fixes as the Dutch did when they were off hostile English shores. All seamen knew that the Dutch made the best charts. He showed the positions of the sandbanks and marked good places of shelter with an anchor. He measured magnetic variation at both ends of the Strait and indicated places where fresh water could be found. Future colonists would want to know about the 'Habitable land and good ground', 'large trees', and 'good fishing', while 'Rocks like asses ears', illustrated as spiky protrusions, might be handy for any captain looking to fix his ship's position. In Parraketto Bay, naturally, 'we see green birds like parrakettos'. A sandy cape close to the eastern entrance of the Strait was named Sweepstakes Forland in honour of the ship, while further along its three-hundred-mile length, beneath a prominent hill they named Mount Misery, we find Batchelars River: hope was clearly fading of their ever seeing the *Batchelor* pink again. There was also Woods Bay, 'called so by my Mate's name'.[†] No doubt Collins was too junior to be granted a similar honour.

Copiously illustrated and attractively coloured, for the better approbation of his lords and masters at the Admiralty and Whitehall Palace, Narbrough's drafts formed the basis of a superb chart of the Strait of Magellan, engraved by the London chart-maker John Thornton and published in 1673.[13] Of all contemporary maritime maps of the Strait, Narbrough's was far and away the most accurate and useful yet seen. It was a huge improvement over the few somewhat notional renditions of the region that had been produced by Dutch map-makers such as Hondius, Gerritsz and Blaeu, based on the surveys of VOC navigators.[14] It was also

Collins' first taste of chart making: drafts that he had helped produce had gone on to be engraved, printed, published and praised. It was a formative experience.

Narbrough was on his way to being one of the most useful officers the English navy had ever had. Collins could count himself fortunate to have served under him, learning by watching him at work, making daily observations of the weather and sea state, and noting down their navigational progress. As master's mate Collins was an apprentice navigator, so along with Wood he would have taken sun sights with a backstaff from the quarterdeck, and soundings with a lead line from the longboat, and become practised at keeping the daily tally of their ever-changing difference in longitude. Once in with the land he would have been encouraged to muck in with pen and ink, drawing the profiles of hills and headlands for the captain's hydrographic drafts, while Narbrough himself made sketches of the animals they encountered in their shoreside rambles. Between them the *Sweepstakes*' officers made an efficient team, surveying both sides of the Strait, some 700 miles of coastline, in just ten weeks.

Collins' two-year voyage to the far side of the world aboard the *Sweepstakes* could hardly have made a more powerful impression on a young master's mate. From Narbrough he learned not only the principles of marine surveying, but also how to make an impressive journal, fit for presentation to the king. All of this would stand him in excellent stead. If John Wood proved to be a reliable tutor, Narbrough was an inspirational mentor, and whatever Collins' career ambitions might have been when the *Sweepstakes* set out, they had been considerably refined by the time she came home. Navigation, certainly – but now also hydrography, the noble pursuit of the scientific sea officer.

Having traversed the Strait, they ventured northwards up the Chilean coast as far as Valdivia, at latitude 39°S, where Narbrough turned his ship about.* They anchored back in the Thames in June 1671, after almost two years away, and the *Sweepstakes*' officers and men went their separate ways.

John Wood made lieutenant straight away, probably recommended by Narbrough,[†] and we soon find him aboard the mighty, hundred-gun *St Andrew*. The following year he was captain of the *Kent*, a forty-six-gun fourth rate, which had the misfortune to pile into the infamous Leman and Ower bank off Great Yarmouth, becoming a total loss. This does not seem to have affected his career, however – there was a war on, and by 1673 he had command of another Deptford-built fourth rate, the *Bonaventure*.[‡]

Meanwhile, Narbrough's career took off. Appointed to the first-rate *Prince* as first lieutenant, he took command when her captain was killed at the Battle of Solebay in 1672, and continued to fight the ship. He was rewarded with a knighthood. Collins was at Solebay too, still as master's mate, aboard the second-rate *Triumph*. She was also in the thick of the action. Naval service had its risks as well as rewards.

Perhaps inspired, like Collins, by Narbrough's example, John Wood's interests also extended to the scientific aspects of seafaring. The Arctic voyage of the *Speedwell* would be an opportunity for him to make his mark as Narbrough had. He was intrigued by the mysteries of the magnetic pole, or poles – he believed there were two – and he had read the accounts of previous explorers to the high northern latitudes. Evaluating the experiences and opinions of seafarers like Barentsz and Borough, and weighing them against the hearsay of the whalers who frequented those waters, he felt confident that there was an ice-free northern passage, close to the North Pole, which would allow them to reach Japan in six weeks. It seemed obvious: if the sun shone up there for twenty-four hours a day in the summer, then the ice was bound to melt.[15]

Wood's social circle included members of the Royal Society, and the great polymath Robert Hooke met with him on several occasions at Garraway's coffee house in Exchange Alley and at the Crown Tavern in Threadneedle Street. Hooke made a note of a conversation they had about

the dipping needle, a sort of vertical compass, which had been found to point downwards in the southern hemisphere and upwards in the north, fuelling Hooke's fascination with the mysteries of the Earth's magnetic field.

Of course, Hooke was fascinated by virtually everything, including navigation, and had plenty of ideas to contribute. A 'sea clock' made for Wood by Hooke's friend and collaborator Thomas Tompion, the London watchmaking prodigy, was an early attempt – long before John Harrison's famous marine chronometers – to solve one of the most intractable scientific problems of the day: finding longitude at sea.

Ocean navigators had long been able to establish their latitude at sea by measuring the angle of the sun above the horizon at noon, subtracting that figure from ninety to find the sun's zenith distance, and then adding or subtracting its declination above or below the equator, which changes with the seasons as the Earth swings around the sun on its tilted axis. This relatively simple process allowed navigators to cross oceans by sailing along the known latitudes of the harbours they were making for.

Longitude was less straightforward. There had been plenty of suggestions as to how it could be done – Henry Bond's *The Longitude Found*, for example, published in 1676, proposed using a dipping needle – but the most promising idea was to compare the time at the meridian where the ship happened to be with the time at a prime meridian. This was long before Greenwich was chosen as the world's prime meridian, and in Collins' day navigators would select their own zero of longitude, which was usually the port where they started a voyage. The principle was simple: the world revolves through 360° in twenty-four hours, or 15° of longitude per hour. If local noon was three hours before noon at his starting point, then the navigator would know that his ship had sailed 45° west of his prime meridian. All he then needed to do, using spherical trigonometry – or a helpful published table – was find out how far 45° was at his ship's latitude.

The difficulty was knowing what time it was at the prime meridian. Galileo had shown that the orbits of Jupiter's satellites were regular enough to use as a sort of celestial clock. The moon's occulting of particular stars

and planets could also be used, but both methods required a powerful telescope, which was just not practical at sea. The lunar distance method, measuring the moon's position in relation to the stars and comparing the time of observation with the predicted time at the prime meridian, required more accurate forecast tables than were available at the time – and seventeenth-century mariners tended not to use the stars, in any case.[16] Lunar and solar eclipses provided another way of determining the time in two places at once, but without accurate predictions they could only be used retrospectively. Narbrough had tried this on his southern voyage, and had also tried using the moon's conjunction with Mars. The results were not good.[17]

What was needed was a clock capable of keeping accurate time that could also survive the rigours of life on board, and here Robert Hooke became involved. To judge from his diary, he was quite possibly the busiest man in London, but he went to Tompion's workshop on 3 May 1676, while the *Speedwell* and the *Prosperous* pink were moored at Deptford and making ready for their Arctic voyage, to consult the watchmaker about 'Captain Wood's pendule sea clock'. Whether this clock arose from a request by Wood or a suggestion of Hooke's is not known, but the scientist was back at Tompion's on 10 May, his diary saying simply, 'Sea clock for Capn Wood'. It was ready.

And so, finally, were the ships. On 27 May their long period of preparation came to an end as the *Prosperous* came down the river to Long Reach, 'and wee set sayle in company down the Kings Channell'.[18] The myriad sandbanks of the Thames Estuary would have been familiar to all naval officers, and were surveyed regularly, and buoyed in places, by Trinity House of Deptford Strond, the navigation authority. But even in good weather the Estuary's shallows and tides presented a serious challenge to

navigators, with a range at springs of more than 15ft. When the wind blew hard it was a dangerous place. Ships were lost there every year.

The *Prosperous* followed obediently as Collins conned the *Speedwell* north-east along the Essex coast, taking the headland known as the Naze as their jumping-off point. This was their prime meridian, from which their 'departure' of longitude would be tallied each day. Wood might have acquired an expensive 'sea clock' from Thomas Tompion, but until that had proved itself to be a useful navigation aid Collins worked according to immemorial custom, keeping a record of his daily longitude estimates.

It was easier when the wind was constant and the ship's speed unchanging, but that did not happen very often: 'Ffrom yesterday noone to this day noone, the wind variable with Calmes and Rains, Course pr Traverse, true course protracted is NW43d.' Bent double in his minuscule cabin, Collins made his journal entries from rough navigation notes he had scratched onto a slate, translating them into an estimated position. He might have done this diagrammatically, on paper, triangulating courses and distances to arrive at their latitude and departure, but he is more likely to have consulted a printed traverse table, which quickly provided these answers for any course and speed.

A record of those courses and speeds was kept by the watchkeepers using a wooden traverse board, a primitive but dependable piece of equipment which was cheap, robust, and impervious to the predations of wind and weather. Its system of pegs and holes could be taught in minutes and used by anyone, whether or not they could read and write. Every half hour the officer of the watch inserted a peg in the hole corresponding to their compass course, and as the eighth peg went in, the four-hour watch changed and the master came on deck to make a note of the courses. Every hour, the log was heaved over the stern as the half-minute glass was turned, and the ship's speed was also pegged onto the board.[19]

With a fresh gale urging them along, the weather was often clear enough to allow for a sun sight or two. By 31 May they were about 25 miles offshore between Newcastle and Berwick, with 50 fathoms under their keel, and making good progress into Scottish waters. Navigation so far had been

straightforward. On 3 June the clouds cleared and Collins got a good noon sight. Latitude was calculated ‘by observation’ if the sun showed herself, or estimated ‘by judgement’ if not. Keeping track of the ship’s progress and position involved some guesswork, and depended as much on the navigator’s experience as on his skill. Wind direction could be ascertained with reasonable confidence, and although wind speed was difficult to quantify, these were less important than their effect on leeway – how much the wind’s sideways force might be pushing the vessel off course. This could be estimated by taking a bearing down the ship’s wake and comparing it with the compass heading. The direction and rate of the tidal stream, if known, also had to be applied. With Fair Isle bearing WNW about 12 miles off, Collins reckoned their latitude to be 59° 23’.

They anchored off Lerwick, in Bressay Sound, the next day. It was Sunday, eight days since they sailed. The islands of Shetland were little more than 500 miles from the Thames, but in spirit and temperament they could have been on the other side of the world. The dramatic scenery and bracing weather may have reminded the *Speedwell*’s captain and master of Patagonia, in the old *Sweepstakes*. Collins was certainly acting on the example of John Narbrough when he set out to do justice to the place. While the other officers readied the ships for their expedition to the far north, he got to work on his journal.

Bressay made an excellent sheltered harbour, he noted, virtually landlocked, with good holding for the anchor. The tide flowed in and out at NNW and SSE at springs, but its range was modest – just 4 or 5ft. Shetlanders ‘spoke after the Scots manner’, and were ‘very poore and hardy’. Their cattle and sheep were small and thin, but the people had plenty of ‘dung hill ffowls’ – chickens – and made a living exporting seabird feathers and salted cod, and knitting stockings and gloves to sell to sailors, mostly the Dutch fishermen who came every year in the herring season. There was no wood, not even fruit trees, and the land was largely barren, but they were able to grow some barley and oats. ‘Garden refreshings they have none, except for colworts’ – cabbages – and they burned peat to keep themselves warm. The lochs yielded trout and eels.

With the *Speedwell* anchored ‘right against Lerwick Towne in 9 fathom water’, Collins took an observation and made the town’s latitude to be 60° 15’, which is six or seven minutes adrift of the true figure, and measured magnetic variation. He reckoned it was 6°W.

The ships spent six days in Bressay Sound, preparing and provisioning. They had no idea how long they would be away. One of Collins’ later journals has been found to contain three loose manuscript charts,[20] presumably filed there for safekeeping, of the approaches to the Strait of Hormuz, of Bandar Abbas in the Strait itself, and of St Augustine Bay in Madagascar. Highly decorated and beautifully coloured, they date from 1630, and were probably drafted by an East India Company navigator. If these old sea maps did belong to Collins, they would strongly suggest that having traversed the Northeast Passage across the roof of Russia, he was expecting his homeward voyage to be via Japan, China, and the Indian Ocean.

Few ships had ventured as far north as they were going, and fewer had returned. The crew were kept busy tuning and reinforcing the rigging, taking on more water, and stowing barrels of salt cod in the holds. Feeling the nip in the northern air, even the hardiest seamen were probably tempted by the crofters’ knitted goods, which Collins noted were ‘warme and cheap’.

Remembering the example of Narbrough and encouraged, no doubt, by Captain Wood, the *Speedwell*’s master was not content with just writing a description of the place. He took the longboat, an azimuth compass, the lead line and a crew of rowers, and set out to survey the sound. The harbour created by Bressay Island is several miles long, and the survey was no small undertaking. Lerwick had professional pilots on hand and Collins would have sought their advice, but with a steep-to, rocky shoreline, the sound has no awkward sands or shallows to worry about, and as a harbour it really was as straightforward for the navigator as Collins’ sketch chart made out. He drew the houses on the town’s waterfront in profile, the military fort in plan, and among his eighteen soundings, ranging from 6 fathoms to 60, he placed anchors to indicate good places to drop the hook. Off-lying rocks

were drawn as conventional small crosses, and the most conspicuous houses were marked. Tall cliffs and the 700ft hill made prominent signposts at the southern end of the island.

It was no more than a half-page sketch chart in his journal, but it was useful, and he was proud of his work. It was perhaps his first attempt at a hydrographic survey – it is certainly the earliest one we know about – and he topped it with a decorative wreath around the title to serve as a cartouche. He sat an ornate pair of dividers over the scale bar, drew a square-rigged ship at the left-hand edge to represent the *Speedwell*, her sails full and pennants flying, and supplemented the sketch with sailing directions, as if in a pilot book:

> If you come from the southard, or from the Coast of Scotland, you most Indevor to make the South End of the Islands. And then Stand along the Shoare till you see a head land like Portland called Hancilfe and to the westward of it a high hill, called the watch hill, And within it is Brace Sound, which you will see to open, the way in is very clear from any danger.

No pilot book he had seen offered this level of detail so far north, but any navigator coming after Collins could have used his survey to get safely into Lerwick.

Wind and weather were variable as they struck out north-east from Shetland, into less-settled latitudes. At noon on the fifteenth the main topsail yard broke, causing chaos on deck as sail, sheets, blocks and the 30ft spar tumbled down on deck. The crew soon set everything to rights but Collins had his hands full, and the timing could hardly have been less conducive to navigation: that day’s latitude was necessarily by judgement.

By 19 June the two ships were well inside the Arctic Circle. From the masthead Collins glimpsed the northern tip of Norway more than 20 miles off, the snow-capped North Cape, south by east – a legendary seamark for English sailors ever since Steven Borough, a north Devon man, first

rounded it in King Edward's time. Collins noted the sighting in the margin of his journal. The seas were stormy and full of humpback whales, which he knew by their Portuguese name, *jubarte*. The air was thick with birds, and the skies clear enough to allow occasional noon observations as they continued north-east.

By 22 June they were up with the ice, a rugged sheet of it with high crags and cliffs that they could not see the end of in either direction, fringed by broken lumps lurking just below the surface. This was the roof of the world, and it did not make them welcome. The Thames froze over regularly, but this was different. The vast dome of the sky in clear Arctic weather can make you believe you are seeing the very curvature of the Earth, and for the crew of the *Sweepstakes* the scale of the ice was awe-inspiring. Collins made a sketch. 'The high hill of ice marked with A was very blew and shining, and all the rest of the ice very craggy and low,' he wrote. 'The blew hill as I did judg might be as high as Westminster Abbey.' In other words, it was as big as anything he had ever seen. He melted some of the ice and found it to be fresh water. Over the page he made a drawing of a fantastical ice arch.

By Collins' estimation they were at 75° 41' N, and solid ice was blocking any further progress to the north. They sailed eastwards along it, probing its many bays and inlets, rounding its capes and headlands 'as though it were land'. Wood had hoped for a northerly route, but there was nothing to the north but white desolation. Even with men stationed in the tops they could not see a way through. Magnetic variation was increasing, and although Collins constantly corrected for it, he was less confident of their position than he had been. On 24 June the sun came out, and he found a 28-mile disagreement between his estimated and observed latitudes, which he ascribed to an ocean current setting ESE.

Another factor contributing to his navigational unease was the convergence of the longitude meridians as they got nearer to the North Pole. We do not know which charts he was using, nor on which projection they were drawn, except that they were certainly Dutch, or based on Dutch originals. He had copied a full-page circular polar map onto the second

page of his journal, opposite a plane chart of the waters off northern Russia, so he was clearly in two minds as to how to think about navigating in these far-flung latitudes. Anyone used to working with plane charts, which assume the Earth is flat and whose lines of latitude and longitude form a graticule of equal squares, might struggle with the constantly changing value of a degree of longitude on a polar projection, and the way in which a straight line drawn across the meridians intersects each one at a different angle.

However, their options were limited in any case. Captain Wood's hopes of an ice-free passage via the Pole had been dashed by the impassable ice sheet to the north of them. The coast of Russia lay to the south. Their only hope was to continue east, and somewhere ahead was Novaya Zemlya. No one knew what lay beyond it, or whether it was an island or a peninsula. Wood had read how Steven Borough and other Elizabethans had found what appeared to be a southern channel, but the way beyond was always blocked by ice. The Dutch explorer Willem Barentsz had gone north around it and wintered on the far side back in 1597, but went no further. In one way or the other lay their only hope of a passage to Japan.

At Lerwick, Collins had dispensed with the Naze as his point of departure, or prime meridian, and had begun a new one on the eastern edge of Shetland. The day he discovered the current, 24 June, was 'very cold and frosty with ffoggs'. He observed their latitude to be 74° 50', took soundings – 128 fathoms – and calculated their difference of longitude from Shetland to be 46° 59', putting the ship about 134 miles from Novaya Zemlya.

He also estimated their 'meridian distance' to be 942 miles since Shetland. This was a running total of the ship's daily east–west 'departure', and was used as a way of keeping an account of the ship's change in longitude when using plane charts. It was meaningless over long distances, however, because the right-angled triangles used in its calculation were drawn on a flat plane rather than a sphere. Navigators using Mercator charts, which are corrected to take into account the shape of the Earth, knew how to establish their longitude by multiplying their east–west departure by the secant of their latitude. Collins' own figures demonstrate the problem:

he gives his meridian distance as 942 miles from Shetland, whereas the value of his change of longitude, 46° 59’, is more than 1,400 miles at the latitude of Lerwick, but only about 730 miles up at the ice sheet. In one of his journals, John Narbrough wrote:

> I take my departure from the meridian of Cape Roxent or Rock (Cabo de Roca) and keep my account from thence in this my voyage according to the method of Mercator’s projection, and I also take the meridian distance according to the plain sea chart, to satisfy such persons as should be inquisitive in that method of navigation, although I know the rule is erroneous and not to be taken notice of in navigation.[21]

In recording both longitude and meridian distance, Collins was following the practice of his old mentor.

Two days later, calm and still, with both the rigging and the men at the masthead frozen stiff, the fog lifted briefly and they saw land ahead, about 15 leagues off: the 4,000ft heights of Novaya Zemlya, standing clear above the horizon even at a distance of more than 40 miles. ‘Very high land and covered with snow,’ Collins wrote, and as they continued their drifting progress eastwards they landed a boat on the ice and encountered walruses for the first time. He called them by their French name, *morse*, and noted that they were massive creatures 12 to 14ft in length, which ‘ly on the ice and sleep And have one of their company that watches and when hee sees any thing frightens them hee wakes the rest of his company’. He made a drawing in his journal of an adult and her calf.[*]

The calms continued. Thick fog again. Squinting into nothingness, the eyes played tricks. But the lookouts had seen how the pack ice seemed to continue all the way to Novaya Zemlya, so it was beginning to look unlikely that they would find a way around to the north. With just a breath of wind in their sails, the ships were borne blindly eastward on the current, ghosting in towards the invisible shore, until on 28 June, they found it.

Looming high and white out of the fog, the rocky, snow-covered coastline rose like a seamless extension of the Arctic pack ice, utterly impenetrable. They had to hope that the southern channel, vaguely indicated on the chart – and it was no more than a suggestion – would lead them through.

Next day the fog was as dense as ever, and the wind steady from west and west by south, when the *Speedwell* found herself in danger of being embayed, with ice suddenly on both sides. The ships tacked round and stood away to the southward on a broad reach, and sounded – 75 fathoms. The land was close.

An hour before midnight, with a light sea running and the sun still well up – although hidden in the oppressive whiteness – the *Prosperous* was shadowing the frigate inshore, rising and falling on the swell, when Collins heard her suddenly call a warning of ice ahead. Captain Flawes immediately ordered his helm across, and with her shallow draught the sharply handled pink spun around almost in her own length, bringing her bow up into the wind and through it, settling on the port tack to make good her escape.

The *Speedwell*, with her heavier displacement and long keel, was not so nimble, nor so fortunate. 'Wee clapt the helme hard a wether and boare up round and brought the ship upon the other tackt,' wrote Collins. But as her bow hauled slowly up towards the wind and the flapping sails began to fill, the swell set her down on a submerged rocky outcrop. She stopped dead, sails set and drawing, masts creaking under the sudden strain. They let fly the sheets and fired off cannon to alert their consort, last seen disappearing into the fog, but she was gone. The *Speedwell* was not going anywhere. It was a couple of hours before high water, but the tidal range was only a few feet, so there was little chance she would be lifted off. The wind was rising.

They sounded from the longboat and found deeper water, 5 fathoms, just a cable to seaward, and there were hopes that with the best bower anchor rowed out on a length of hawser it might have proved possible to winch her off. But the waves by now were 4ft high, and with the ship held fast on the rocks, it was too difficult to lower the huge anchor into the boat. Impossible, in fact: the mass of iron would have simply smashed the boat

on the rise and fall, drowning its crew. The seas rose still further, lifting the hull and setting it back down with a regular, sickening crunch as the ship began to pound. Wood ordered the men to cut away the masts to try to ease her motion, but by now the water in the hold was rising faster than they could pump it out. She was coming apart. The *Speedwell* was doomed.

The pinnace crew sailed into the fog and the surf in search of a safe beach to land on, but failed to find one on the rocky foreshore. When the fog began to lift, they tried again, with better luck: they found a landing place near a stream, 'very joyfull news'. Wood gave the order to abandon the ship. There was no panic. Both boats were loaded with anything that could help ensure survival: carpenter's tools, powder, shot and weapons, and after as many men as each could carry had clambered down the side of the stricken ship, they set out for the shore. On the second trip, close in and heavily loaded, the pinnace broached on a breaking sea and capsized, spilling her passengers and sinking with her cargo of bread and provisions. Two men drowned in the waves.

There was no more salvaging to be done. Collins wrote: 'The ship was ffull of water for that wee could not come to noe more bread nor any thing else, But had much trouble to gett safe a shoare.' Incredibly, he was able to save his journal and his navigation notes.

In the morning, he took stock. They were in a bay, with the dismasted remains of the *Speedwell* stranded on rocks some distance offshore. Their landing place, where a meltwater stream emerged from under the ice and formed a beach, was the only accessible point along the shoreline – 60 yards either side of it, cliffs of ice and snow overhung the surf. The longboat had been hauled safely up the beach, 'with much trouble', along with their little yawl. They had moved their salvaged gear up the rocky slope and built a tented encampment out of sailcloth and oars. There was nobody about, but a short way to the south a solitary Dutch flag flapped disconsolately from a pole – the forlorn remnant, perhaps, of an earlier shipwreck. Across the stream from the camp lay a small, stone-built herder's shack, which Captain Wood commandeered. Everyone was soaked through, and the weather was freezing. There was no wood anywhere to

make a fire. A polar bear appeared and started sniffing around, but one of the men loosed off a musket and it ran away. From their new vantage point above the sea, they had a better view out to the west, but the *Prosperous* pink was nowhere in sight.

They prayed: not for salvation, but for the wreck of their ship to be driven ashore so they could use her timbers and salvage more of her cargo. That very day the wind swung round, and her broken remnants began to drift in on the waves, directly onto their beach. Barrels of flour, brandy and oil were washed up, and great masses of timber. They built huge fires and began, thankfully, to dry out.

What would Narbrough have done? Collins had not forgotten his old captain. He went exploring with Wood and the lieutenant, and saw signs not only of bears but of deer and foxes, noting the marble and the slate and the strange smell of the grass. He picked up a curious crystal and put it in his pocket.[22] The hills behind their encampment were high and inhospitable, covered in rocks and deep snow, and offering no obvious way over or around. The going was heavy, with ice and snow and areas of bog that sucked their boots off. When they returned to the camp, they found that a bear had attacked, and although the gunner had fired both his muskets it still came on, and he was reduced to beating at it with the stock of his gun until friends came to his aid. It took several bullets to kill. They ate it: 'The beares fflesh was very ffatt and good and eate well to our great refreshment,' Collins wrote.

Across two pages of his journal, he also made a sketch of their predicament, which is part pilotage chart, and part narrative history of the shipwreck and their efforts at survival. He marked the rocks along the shore, with a few soundings, and the shape of the coastline, and drew the sad wreck of their ship trapped on the rocks in the middle of the bay, her main and fore masts cut away and just the mizzen standing. A miscellany of tents represented their encampment, with a huge bonfire, and Captain Wood's stone house was shown across the stream. The two boats and some barrels were pictured hauled up on the shore, while the Dutch flag and their own colours flew from their makeshift poles in the breeze. Behind the bay,

overlooking the camp and emphasising the hopelessness of their situation, he labelled the impassable snow-clad hills ‘Mount Missery’.*

As the days wore on, they began to lose hope of seeing the *Prosperous* pink again. She was their only chance of rescue. Conditions were windy and cold, and the fog was ever-present. There were seventy-two of them stranded on an Arctic hillside, far too many for the longboat, and the little yawl was no use – it was too small to survive a sea voyage. Captain Wood talked to the carpenter about using timbers from the ship to enlarge the longboat – they could cut it in half and add a new section of planks and frames, lengthening it by 10 or 12ft, and then deck it over. That would make it big enough, just, and Collins reckoned it was 600 miles or so back to Archangel. But the carpenter wasn’t keen – he was not well, and his mate was worse. The hands worried about cutting the longboat in half if the carpenters should prove too ill to put it back together again.

The men began to murmur. Wood worked out a compromise: they would raise the longboat’s freeboard by one strake, deck her over, and he would sail with a small crew to get help. The *Speedwell*’s sailors went along with it, but in their desperate predicament they were beginning to lose faith in their captain. Some suspected a plot: Wood and his officers were going to steal the boat as soon as it was finished and make off with it, leaving the men to their fate. Collins saw that many of the seamen had armed themselves, and were keeping their weapons close.

It was not a revolt. There was no wish to usurp Wood’s authority, or up-end the status quo, for the discontent among the hands was founded on fear, not revolutionary fervour. There had been quite enough of all that: the lawlessness of the English civil wars and the failure of the Commonwealth had been poor advertisements for Cromwell’s revolution. In the words of one historian, support for it had been intense but shallow, while opposition ran silent and deep.[23] The years of upheaval had not improved the lot of working men. Naval salaries had been increased to boost recruitment, but the men soon found that they were no more likely to receive their wages under Cromwell than they had been under the king.[24] Those in power had sorely tried the people’s faith in authority, and now, for the *Speedwell*’s

crew, the loss of the ship represented another betrayal. They simply did not know who they could trust, except each other.

The men were not mutineers – not yet – but Collins kept a wary eye on them and helped Wood come up with schemes to keep them busy. ‘The wind at W with great and continuall ffoggs,’ he wrote on 5 July. ‘All our company now imploying them selves in bakeing cakes for the voyage and the carpenters hard att work about the Long boat.’

It was an uneasy truce, for unbeknown to the captain, one of his Dutch charts had washed up on the beach, which clearly showed a town at the southern end of Novaya Zemlya called Waigatts.* Some of the hands had seized upon this hope, and forty of them had resolved to walk there. It was a mad proposal, born of desperation. Collins could not be sure of their exact position, but he could see that the town, if it existed, was at least a couple of hundred miles away. The terrain was not just difficult, it was positively hostile. There was no chance of getting all the way down there on foot. Both Collins and Wood also knew how optimistic Dutch engravers could be about such things, with their habit of placing onion-domed churches where there might be nothing more than a couple of abandoned crofts. Anyone who survived the ordeal might find that they had exchanged one desolation for another.

Treading carefully, for the men were clearly no longer in the mood for a debate, Wood persuaded them to wait a little longer. The weather might clear up. Flawes would be looking for them. They should stay together – strength in numbers – and keep a good lookout. Grumbling, they agreed.

‘The wind att SW and the morning cleare,’ Collins noted, the very next day. And there, in the offing, was a sail. It was Saturday, 8 July. ‘To our great joy,’ he wrote, ‘wee presently made a great ffire and sent away our small yaule to meet him.’ Flawes spotted the smoke and bore down towards the beach and the rejoicing shouts of the men. The carpenters stripped off the part-completed new planks from the longboat and the hands launched it into the water, at the same time as Flawes manned his boat and sent it in. ‘About noone wee gott all on board Capn Flawes.’

Somehow the good captain found room to stow the *Speedwell*'s surviving crew aboard his diminutive pink – she may have been of shallow draught, but she did at least have a voluminous hold, and plenty of provisions. Flawes also salvaged the *Speedwell*'s anchors and cables.[25] It was a long, tedious, cramped voyage back across the Arctic Ocean and down the North Sea. On her way home the tubby little overcrowded ship was beset by storms, calms, and contrary winds, not to mention the everlasting fogs, which seemed to follow them south. But finally, after three months away, they picked up a mooring off the Deptford Royal Dockyard on 25 August.

Turned ashore with nothing but the clothes they stood up in, and the few personal possessions they had managed to keep by them, the officers and men of the *Speedwell* made a sorry sight. Nothing more was heard about Captain Wood's Thomas Tompion 'sea clock'. Presumably it was not a success. Robert Hooke evinced no interest in following it up, and had perhaps forgotten about it, remarking absentmindedly in his diary, under the wrong date: 'Capn Wood return'd, having lost the speedcock [sic] on Nova Zembla on 72 latit.'

Samuel Pepys and his fellow investors were no doubt disappointed by the failure of the expedition, but there was some consolation. While a claim made by the *Speedwell*'s men for clothing lost in the shipwreck was turned down, Pepys himself, always alert to any prospect of personal enrichment, successfully billed the Admiralty for the food they had consumed while they were on board the *Prosperous*.[26]

Naturally, Captain Wood was called upon to account for his loss of a king's ship. Pepys wrote to him on 31 August to inform him that the king and the Lords of the Admiralty would welcome, 'as well to their own present satisfaction as for the transmitting to posterity a true and distinct account of your late proceedings in your voyage with his Majesty's ship the

Speedwell'. The naval secretary understood that owing to the 'unfortunate miscarriage' of the ship, 'your journal and papers are lost'. However, he added, 'the journal kept by your master is preserved'. Pepys had already seen Collins' journal, and suggested that Wood might consult that, in order to prepare 'as perfect an account to be faithfully and distinctly drawn up as by the help of your master's said journal and your own memory and notes'.[27]

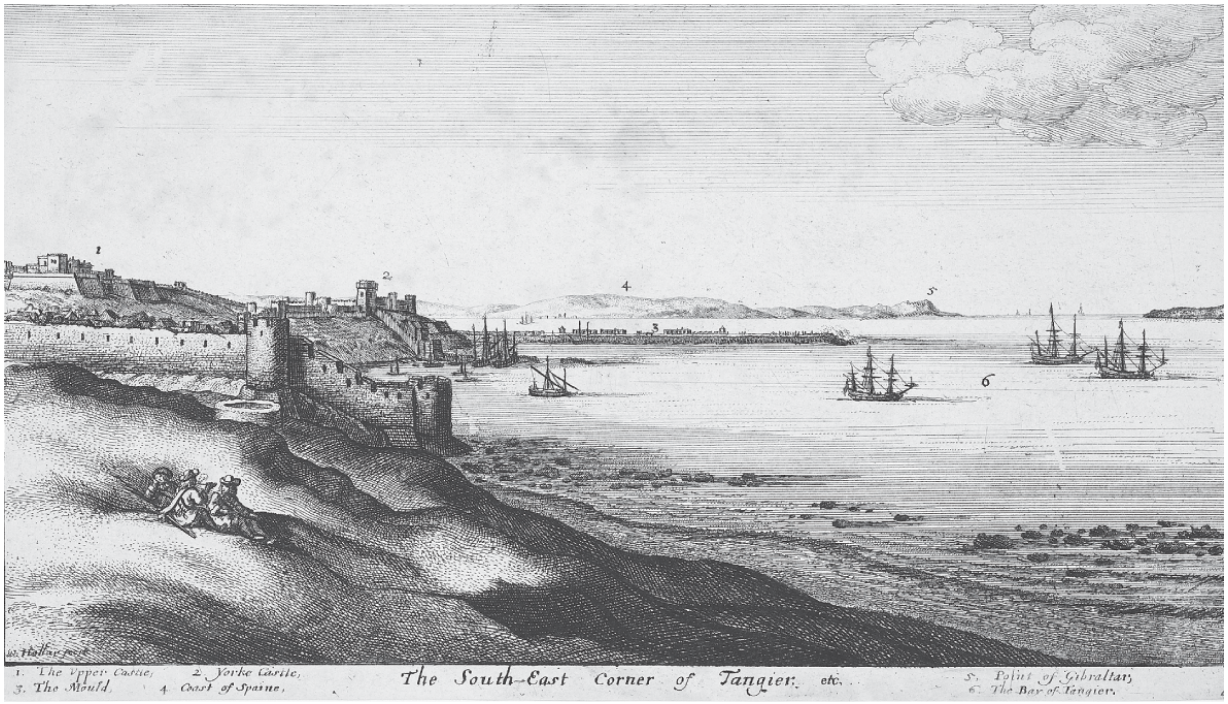
Wood followed Pepys' advice. He borrowed Collins' journal and paraphrased, rehashed, lifted, rewrote and plagiarised whole sections of it, which, as captain of the ship, he was perfectly entitled to do. He even made quite a good copy of the drawing of the walrus – unless he got Collins to do it for him.

Some remnants of Wood's own navigational notes had evidently survived the shipwreck, because although much of what he wrote in this new journal was a faithful re-rendering of Collins' work, there are places where their calculations differ, sometimes markedly. Their 'meridian distances', in particular, are often many miles apart. There are also one or two entries in Wood's account which are so nearly-but-not-quite the same as those in Collins' journal that, had he been a schoolboy sitting next to the cleverest pupil in class, they would have aroused suspicion in the most sanguine of examiners. Collins' estimate of their latitude on 22 June, for example, after three days without a sun sight, was a pragmatic 76° 0'. Wood's was a slightly implausible 75° 59'.

When it came to Collins' chart of the *Speedwell*'s track along the ice sheet, the captain was careful to amend the labelling on his own version, to better befit a man of his rank. So Point Misery on Collins' chart became Point Speedwell on Wood's. He also took the opportunity for some political brown-nosing, selecting a couple of random headlands that Collins had ignored, and naming them Cape James and York Point after the king's brother, James, Duke of York. The crowning compliment concerned the high, snowy ground behind the shipwrecked mariners' bleak encampment on Novaya Zemlya. What for Collins had been Mount Missery, for Wood became the King Charles Snow Hills.

The king was shown the results of his captain's efforts on 30 September, and 'was pleased to peruse the same with great satisfaction'. To Wood's satisfaction, too, no doubt: having submitted his journal, he could now look forward to receiving his pay for the voyage.[28]

But there was no danger of Captain Wood being able to claim any of the credit rightfully due to the *Speedwell*'s master. Collins' journal had already found its way into the king's hands, probably via Samuel Pepys himself. In consequence, Collins had been called into the presence of the king at Whitehall Palace, to give his first-hand account of the Arctic misadventure. His majesty obviously liked what he saw in the tanned and weatherbeaten West Country warrant officer. He had a job for him.



Tangier from the south-west by Wenceslaus Hollar, looking across to Spain, Gibraltar and the Straits. (Purchase, Joseph Pulitzer Bequest, 1917, Metropolitan Museum of Art)

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* On a starting salary of £350, his liquid capital grew from £25 in 1660, when he was appointed to the position of Clerk of the Acts at the Navy Board, to £7,000 by the end of 1667. [‘Samuel Pepys and Corruption’, Mark Knights, *Parliamentary History* vol. 33 Issue 1, 2014.]

* The published version appeared after Narbrough’s death. Significantly amended and edited, it seems to be a collaborative effort, because although the first person singular is used throughout, the captain is sometimes referred to in the third person. The most likely co-author is John Wood, because the lieutenant had been left behind in Valdivia along with three other members of the crew.

† Variation was not well understood. Early maps such as the Swedish *Carta Marina* suggested the existence of a magnetic island up in the Arctic. Some compass manufacturers had taken to offsetting the magnetised needle beneath the card to make the compass point to true

north, but since variation varies according to where you are, this adjustment was only correct in the compass-maker's workshop. [May p. 81.]

* Defoe no doubt drew on many sources for *Robinson Crusoe*, and we can probably include Narbrough's journal among them. Compare this from Narbrough: 'Having a sort of goods to the value of three hundred pounds as followeth: knives, sissers, glasses, beads, hatchets, bills, hoes, nailes, needles, pins, pipes, bells, boxes etc to trade with the natives', with this from Defoe: 'Toys as were fit for our trade with the negroes, such as beads, bits of glass, shells, and other trifles, especially little looking-glasses, knives, scissors, hatchets, and the like'.

† 'Mate' and 'master' were used interchangeably. At the beginning of the Arctic journal Collins refers to himself as 'Greenvil Collins master', and at the end he signs off as 'Greenvill Collins, m8'. He also spelt his own name in various ways, as here, but mostly used Greenvile.

* In a letter written much later, Collins claimed that owing to 'cowardice', the *Batchelor* 'most basely left us before we got to the straits of Magellan and returned back for England reporting that we were lost in a storm. This ship laden with the stores. Had not this misfortune happened our design was to have sailed to California and searched the North Coast.' [Burney.]

† The lieutenants' examination did not come in until 1677. It was one of the Duke of York's reforms, encouraged by Narbrough. [Davies, *PN*, p. 92.]

‡ There seem to be several John Woods in the records, but this appears to be the most credible career progression for the captain of the *Speedwell*.

* Copied, it would seem, and not very accurately, from Dutch cartographer and engraver Hessel Gerritsz's 1613 book about Spitsbergen.

* Tempting as it is to imagine mounting an expedition to discover the wreck site and recover artefacts from the *Speedwell*, there is unlikely to be anything left to find. Novaya Zemlya was a very active nuclear testing zone in the 1950s and '60s. The Tsar Bomba, the most powerful

device ever detonated, went off not far away. [https://en.wikipedia.org/wiki/Novaya_Zemlya]

* Vaygach.

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2

Blood and Treasure

I had the good fortune to take the Golden Marigold, one of the best ships of Algiers, after a long battle, neere two hundred Turks and Moors were killed, the loss on our side is Capn Canning killed and severall men in both galley frigates, and in two other ships.

Admiral Sir John Narbrough, Cape Spartel, 29 September 1677

At noon on Sunday, 4 February 1677, Greenvile Collins was evidently feeling pretty confident in his abilities as a navigator. On a new page of his journal, headed 'Charles Frygt Bound for Tangere',[1] he summarised the weather, noted the ship's creditable progress since the previous noon, and wrote down its estimated position. The frigate had left the English Channel, given the Brittany peninsula a wide berth, and he was now shaping a course across the Bay of Biscay that was intended to place the north-western tip of Spain safely under their lee when they crossed the 43rd parallel in a few days' time.

In his journal he wrote: 'From yesterday noone to this day noone the wind variable from the WbN to the NNE with Gusts and Raine, Course pr Compass between the SSW and the SW, Distance Sayled by the Logg 123 miles, True Course allowed by leewardway and Cast of a Great Western Sea is SWbS, Difference of Lat 100 miles, Departure 66 miles, Latitude by Judgt 47^{d} 32^{m}.'

In the last twenty-four hours they had been propelled 100 miles further south by a blustery and shifting winter breeze, on a fairly steady compass

course, and by Collins' estimation, allowing for leeway and the set of a big swell from the west, the ship was now some 66 miles to the west of his 'prime meridian', the longitude of Falmouth. In such unpromising conditions for a sun sight, he had already estimated their latitude, based on the previous day's observation. But then the sky cleared, his quadrant came out of its case, and adopting a firm stance on the tilting deck with his back to the sun, he aligned the bottom edge of the instrument with the horizon, slid the vane along the curved degree scale until its shadow intersected it, and read it off: 47° and 32 minutes. He turned back to his journal: 'Latitude by Judgt 47^{d} 32^{m}, the same by observation.'

The mention of his earlier estimate was hardly necessary. The journal was, after all, but a fair copy of his scribbled calculations, and the important point was that he had been able to make an observation. But to have the accuracy of his judgement confirmed by a sun sight might carry some weight when the journal was inspected by the Lords of the Admiralty at the end of the commission. They would see that he was a master of his trade.

Once his Arctic journal had been singled out by Pepys and praised by the king himself, word of Collins' professionalism and competence started to get around. An experienced captain, Sir Robert Robinson of the forty-gun fourth-rate *Assurance*, fitting out for duty in the Mediterranean, wanted to appoint him as her master. It would have been an excellent promotion for Collins, but the king had other plans for him. Tasked with finding jobs for the returned officers of the *Speedwell*, Pepys wrote to the Navy Board on 4 September:

> The writer has this morning received his Majesty's particular directions in favour of Mr Collins, her master, from whom and his journal of her late voyage his Majesty hath received so much satisfaction that instead of the *Assurance*, where Sir Robert Robinson hath desired he might have him, it is his pleasure that he be appointed to the mastership of the galley frigate now going forth from Woolwich.[2]

Collins was making a name for himself. In just nine days since arriving back in Deptford following the disastrous Arctic voyage, he had been congratulated by the king, headhunted by a senior naval captain and now, at the monarch's particular insistence, hand-picked for a challenging job in an entirely new type of ship.

The *Charles* galley was classed as a fourth rate, built by Phineas Pett and launched on 15 September at Woolwich Dockyard.[3] She was a much more substantial ship than the ill-fated *Speedwell*, measuring 131ft on her gundeck, with twenty-eight nine-pounder guns, four three-pounders, and a crew of 220.[4] In a painting made shortly after her launch, Willem van de Velde the Younger shows her to be an elegant, three-masted, square-rigged ship with a high stern, gilded decorations and a graceful sheer, a lateen sail on her mizzen mast and yards for both a spritsail and spritsail topsail rigged on her bowsprit.[5] Most of her guns were up on the main deck. The small ports closer to the waterline, twenty per side, were for oars. A near sister ship, the thirty-gun *James* galley, shorter than the *Charles* by 19ft but similar in beam and deeper of draught, was launched by Anthony Deane at Blackwall a couple of weeks later.

Galleys were not unknown in the English navy, and had long been used by the navies of the Mediterranean, where their useful ability to make progress against the wind, or in no wind at all, had been recognised by the Admiralty as a tactical asset in the sultry summer months. The English had recently acquired one from Italy, the *Margaret*, with a mixed naval and civilian crew, plus galley slaves, and stationed it, rather expensively, at Tangier. On being told that it was costing some £17,000 a year[6] and had not, so far, achieved anything,[7] the Admiralty ordered an investigation which discovered that due to her large crew complement she was listed as a second-rate ship of the line, with a wage bill to match. However, as Pepys breezily noted in the minutes:

> … though her number of men be indeed about 460, forasmuch as a great part thereof are slaves who receive no wages, and the wear and tear of a galley not equal in proportion to a frigate, as going abroad

> only in summer and fair weather, she should be estimated but as a 4th-rate ship of 200 men, bringing her whole charge of the year round at the common medium of £4 a man a month to £10,400.[8]

It was still too expensive. A later meeting of the Admiralty Commission agreed that she should be laid up, her officers and seamen dispersed, her civilian crew paid off and sent home, and her slaves sold.[9] These unfortunate captives, who included twenty-one Native Americans from New England, were put to work building the mole at Tangier.[10]

But using galleys for naval operations in the Mediterranean was still an attractive idea. A proposal by a Genoese nobleman to lease two fully manned war galleys to the Admiralty for £5,000 a year each was briefly considered,[11] but in the end the king decided that England should build her own. The template for the hybrid galley-frigate concept was French. Pepys had heard that some were being built at the French naval dockyard in Toulon, so the shipwright Sir Anthony Deane contacted a spy he had in the French port, and a full description duly appeared. 'The answer being returned, AD's son drew the draught of the James galley-frigate, and Mr Pett the Charles, upon the same principles,' Pepys noted.

The Mediterranean trade was becoming ever more lucrative, not only for London's Levant Company, but increasingly for independent shipowners too, who were beginning to find willing markets for English wool and woollen cloth, lead, pepper, Newfoundland cod and Yarmouth herrings. They would return home with their holds full of wine and fruit from Spanish ports. Much of the English navy at this time was concentrated on Mediterranean routes, escorting these valuable and sometimes sizeable convoys.[12]

English merchantmen had been enjoying a free run as neutral carriers in the Mediterranean since the peace, while Spain, Holland and France fought it out with each other.[13] But their convoys were still vulnerable to the predations of pirates and state-sponsored privateers based in the North African ports. These 'Barbary corsairs', referred to more often than not as 'Turks' by Collins and his contemporaries, sallied forth in small squadrons

from Algiers, Tripoli and Tunis, Islamic city states on the North African coast under the jurisdiction of the Ottomans. On the Atlantic coast, the sea ports of the Kingdom of Fez, Salé and Rabat also maintained a fleet of these troublesome privateers.[14] They were lured as much by the wealth in the cargos of the European merchant ships as by the value of their captured crews, who were ransomed, if their relatives were rich, or else sold into the Mediterranean's thriving slave economy. Their ships, too, were often captured European vessels – larger, more heavily armed and more seaworthy than traditional Mediterranean galleys, and usually captained by European mercenaries.[15]

The corsairs roamed throughout the Western Mediterranean and beyond. Iceland, Ireland and England's south-west had all been targeted in slave raids, and sometimes still were, while merchant ships could not feel safe even in the western approaches to the English Channel. The European powers had made concerted efforts to curtail the corsairs' exploits, both by force and diplomacy. England had realised that in the long term, forging alliances with the Barbary states had the beneficial consequence of redirecting their piratical energies towards her trading rivals. The Algerines had been encouraged to the negotiating table in 1671 after some particularly aggressive handling by Captains Richard Beach and Sir Edward Spragge, who between them destroyed thirteen Algerine frigates. That treaty had been broken by 1677, but under the command of Sir John Narbrough, the English fleet had scored a dramatic success at Tripoli in January 1676, when one of his protégés, Lieutenant Cloudesley Shovell, launched a night raid by boat into the harbour and torched four men-of-war. Narbrough followed up by destroying four more at sea, and the subsequent treaty signed with the Dey of Tripoli proved lasting.[16]

Nevertheless, the corsairs still represented a serious problem for English trade in the Mediterranean. The *Charles* and *James* galleys were built to help counter the threat.

Collins reported aboard his new ship at Woolwich on 16 October 1676, cramming bags, charts and instruments into his tiny cabin under the poop deck and drawing 'rigging wages' as he helped oversee her final fitting out.

A few weeks later she was moored further down the Thames at Long Reach, taking on provisions and crew, including eighty Thames watermen as rowers, and tasked with transporting a draft of soldiers to the English garrison at Tangier. She would then join Admiral Sir John Narbrough's fleet on convoy and patrol duties in the Mediterranean. Her captain, Thomas Hamilton, was already in Tangier and would join his new ship when she arrived. In the meantime, the officer in charge of the *Charles* was a young lieutenant, James Dunbar, tasting the responsibility of command for the first time. The *James* galley was also making ready for sea, under the command of Captain George Canning.

It was a bitterly cold winter. 'Set sayle from Long-reach and fell Downe into the upper end of the Hope,' wrote Collins on 5 December. 'The wind att ENE with great ffrosts and winds.' It swung round to the north over the following days as particularly harsh weather set in, 'with much snow … and very great frosts'. Banked on either side by the distant salt marshes of Kent and Essex, these broad lower reaches of the Thames offered nothing in the way of shelter from the penetrating winds. Iron-grey water merged seamlessly with an iron-grey sky, dimly reflected at low tide in vast expanses of mud. Upstream, the river froze over, and great chunks of ice drifted down on the tide, endangering the ships and threatening to uproot their anchors. 'Sayled downe into the lower end of the Hope to avoyde the Ice which came downe the River,' Collins recorded on 15 December, and for the next week the weather continued to worsen. 'Many ships came up into the Hope Rilating that the Swin and the fflatts was full of Ice. Severall Dutch ships came up, being they could not gett into Holland by reason of the Ice.' On 21 December they re-anchored their ship again on the western shore of Hope Reach in an effort to escape the heavy ice floes bumping and scraping down her sides. Meanwhile, the business of manning and provisioning had to go on.

Conditions on board can only be imagined. For the seamen and officers there was work to be done, fine-tuning the rigging, stowing the stores safely in the hold and readying their new and untried ship as best they could for the long voyage ahead. Having spent his summer fighting a losing battle

with the ice in the Arctic, Collins was no doubt as keen as anyone to get under way and head for more temperate latitudes. For the Thames watermen drafted aboard the *Charles* as rowers, sub-zero temperatures added discomfort to the tedium, although they could at least make themselves useful on board. But the soldiers, thirty of whom arrived on 23 December, were out of their element, huddled below decks, and thoroughly miserable. Collins, busy with his work but anxious about what the ice might have done to his ship's lead hull sheathing, arranged for her to be heeled over and inspected. 'All well and no damage,' he noted.

Lieutenant Dunbar, the *Charles*' young temporary commander, was also feeling the pressure, and kept up a steady correspondence with the Admiralty. 'The soldiers on board are in extreme need of clothes,' he wrote from the Leigh Road anchorage, adding that he had no fish on board, only oatmeal.[17] 'The soldiers now begin to fall sick for lack of clothes,' he fretted a few days later.[18] One of the watermen jumped ship at Deal.[19] Dunbar worried that the standing rigging was too lightweight. Not wanting to sound ungrateful, he added: 'But she sails well.' The longboat capsized in a gale: they recovered the boat but lost its oars. He apologised for not writing more often.[20]

Over on the *James*, meanwhile, Captain Canning had his own problems. The consignment of coats was welcome, he informed their lordships, but unfortunately one of the soldiers had already gone mad.[21] The anchors were too light, and he lacked provisions. Having managed to put the afflicted ashore at Sandwich, he was beefing up the shrouds to better withstand the winter gales.[22] The pork he was promised had yet to make an appearance.[23]

Anchored in the Downs, the broad roadstead off Deal sheltered by the high Kentish cliffs on one side and the Goodwin Sands on the other, both ships received their sailing orders for Tangier on 17 January 1677. The officers broke out the brandy. 'Wee loosed our ffore topsayles,' wrote Collins, in what seems to be an early naval euphemism for a drunken celebration, since there were still some days to wait for a serviceable wind. When they eventually weighed anchor, along with three East Indiamen, they made their way down-Channel in long tacks, south to within sight of

Guernsey then north again to Portland Bill, and after sheltering from a gale in Plymouth, finally set off from Falmouth on 31 January:

> At nine in the morning sprung up a gale at NW, wee set sayle in company of the James. At noone the wind at WSW, wee stood to the Southard, at six at night the west point of the Lizard boare NbW about five leagues off.

As if to compensate the ships for their fraught and long-delayed departure, there followed an almost perfect passage south. Variable at first, the winds settled in the north and sped them so well on their way that they made good more than 100 miles of southing on six consecutive days. At six in the morning on 7 February the lookout spotted the Burlings,* a perilous unlit archipelago of rocky islets off the Portuguese coast. Next day they were at the latitude of Lisbon and, with the towering 250ft cliffs of Cape St Vincent receding astern on the morning of 10 February, in thick, cloudy weather and variable winds, they entered the war zone.

Almost immediately the lookout spotted two ships in the offing, which on closer approach revealed themselves to be Algerine frigates. Captain Canning gave the order, and without pausing to haul in their boats, the two English ships gave chase towards the African coast, piling on sail. By three in the afternoon, they had the summit of Cape Spartel in sight, near Tangier, about 10 leagues distant. Collins reckoned their frigates sailed as fast as the Algerines, but with their longboats in tow they were not fast enough. They hove to at nightfall with the Algiers ships disappearing into the gloom, and at noon next day they joined other English men-of-war and merchantmen in the busy anchorage of Tangier, England's sole possession in the Mediterranean theatre. The troops disembarked thankfully. The *James* delivered a consignment of money to the garrison, before being sent off almost immediately to the Spanish Atlantic port of Cádiz in company with Sir Robert Robinson's *Assurance.*

The *Charles* spent the next few days taking on water and ballast from the mole, while Captain Hamilton moved on board to take command and receive a debrief from Lieutenant Dunbar and Collins, her master, about his strange new hybrid ship's seagoing qualities. As totally new types for the king's navy, the two galley frigates had been thoroughly evaluated by their crews on departing the Thames, racing against each other under the watchful eye of Captain Lovell in the *Katherine* yacht, who had been sent downriver by the Admiralty to observe.[24] The king, an enthusiastic yachtsman, took a personal interest in these new ships.[25] Collins was pleased to find that the *Charles* was the faster of the two – which she certainly ought to have been, with her longer waterline and finer lines – as well as more weatherly. In the short reach from Leigh to the Nore she had managed to get to windward of the *James*, while in four hours of sailing between Red Sand and the Downs, she reduced the *James'* 4-mile lead to just half a mile. 'After that wee came about the North Ffurland to haul up sharp, the wind blowing hard. Wee handed both our topsayles, but wee found that our ship over reacht upon the James apace, and caryes a stout sayle.'

Captain Canning of the *James* didn't quite see it that way, however, and told the Admiralty that his ship was the finer sailer. Pepys' reply was diplomatic: 'The victory between your frigate and the *Charles* seems hitherto to remain doubtful, but His Majesty wants not the greater satisfaction of having it owned by Captain Lovell himself that they are both extraordinary sailers.' Pepys wrote the same day to reassure young Lieutenant Dunbar that Canning's claims were being taken with a pinch of salt in London: 'The crack runs variously touching the two frigates' sailing.'[26]

A veteran of the Dutch wars, like most of his naval contemporaries, Captain Hamilton had also commanded the *Margaret* galley during its expensive sojourn in Tangier, so he was keen to try his new charge under oars, and perhaps also to see how Thames watermen compared with the enslaved rowers of the *Margaret*. They soon got their chance. The *Charles* was in Gibraltar: 'In the morning it was very calme, wee heaved up our

anchor and rowed about the bay for about two hours, finding the fryggott to row very well,' wrote Collins. 'In the afternoon the wind att West.'

There followed a wartime routine of patrol, convoy escort and ferrying supplies and personnel between Tangier and the Spanish Mediterranean ports of Cádiz and Gibraltar. Acquired from Portugal, Tangier gave the English the strategic base at the entrance to the Mediterranean that they had wanted for some time. After a shaky start it had developed into a busy trading port, although it was expensive to maintain, difficult to defend, and of very limited value to the navy.* During the second Anglo-Dutch War it had made a useful haven for English privateers preying on Dutch and French merchant shipping. Work was under way to improve the fortifications, and construction of a huge new mole had been put in train to enlarge the harbour. The town also served as a base for co-operation with the local rulers, or for hostilities against them when diplomacy failed.[27]

As it clearly had when the two galley frigates arrived. 'Tangier is at prisant at warr with the moores,' Collins noted from aboard the *Charles*. Attempts to beef up the outer defences had merely aggravated the local militias, who made night-time raids to pull down the wooden stockades, inflicting regular casualties on the English soldiers while seemingly heedless of their own: 'Every day and night there are some small skermishes with the moores.' They were a force to be reckoned with. The first English governor of the colony, Lord Peterborough, described his adversaries as 'about 5,000 horse, able, dexterous, sober, valiant, incomparably well armed and clothed, and horsed'.[28] It did not bode well for the English colonial experiment.

Almost as challenging, Collins discovered, were local sailing conditions. Patrolling the Straits in company with the *James*, Collins found an inshore current that swept them to the east and forced them to bear away for Tangier, where it threatened to drive them ashore. 'We sayled against it five glasses and could not gett anything.' He noted that its speed by the log was more than 4 miles an hour, while the *James*, just two cables to seaward, experienced no current at all. Gales sprang up without warning, scattering ships through the Straits as they sought sea room. In a ferocious storm in

early March the *Charles'* mainsail tack give way, causing her to career through a fleet of merchantmen barely under control. Next day saw her making better than 7 knots while running before the wind, or 'spooming', in a gale so strong that she was unable to bear any sail at all. Collins wrote: 'I allowed our ship to spoome 9 and 10 leagues a watch without sayle.' Captain Hamilton ordered him to steer for Alicante in southern Spain, 'our ship wanting ballast and not fitt to keep the sea in bad wether'.

With her banks of oars down near the waterline, the lightly armed *Charles* had a much higher centre of gravity than a conventional fourth rate. She mounted only six of her guns on the lower deck, with her main battery of twenty-two saker cannon, weighing 2,000lb apiece, up on the main deck, well above the waterline. For the next two days in Alicante, they topped up her casks with water and lowered 15 tuns of stones into the hold, closely supervised by Collins as he kept a careful eye on his ship's trim. It helped, but it wasn't enough – anchored off Rocquetas on a calm day not long afterwards they took the longboat in for three more loads. Whether this was rocks from the beach, or fallen stonework filched from the town's dilapidated castle, Collins doesn't say, but he did remark that it was 'good ballast'. In Gibraltar a few months later they loaded another 22 tuns aboard, stowing the stones as low down and as close to the centreline as possible.

The *Charles'* officers and crew also worked on improving the sailing performance of their ship, which was all very well in races against the *James* but still, they felt, offered room for improvement. At anchor in Tangier Bay, Collins supervised some adjustments to the rig, bringing the ship's centre of effort slightly further aft to correct its lee helm, a tendency to turn downwind. This involved striking the forward and main topmasts down on deck, turning the lower caps around and then restepping the topmasts behind rather than in front of the supporting lower masts. It was a tricky job, especially as England's navy was still a newcomer to the Mediterranean, with no permanent bases and little shore support for such work. Spain's naval shipyards were off-limits, and agreements to use individual ports had to be struck with local mayors. When Sir Roger Strickland's forty-six-gun fourth-rate HMS *Dragon* developed a rudder

defect, she had to go back to England for repairs, and when both galley-frigate captains decided they needed to strengthen their ships' rigging by replacing the shrouds with something heavier, new hawsers had to be sent from London.[29]

To Collins, everywhere was new. Tangier Bay was a broad expanse dominated by the fortified town on its south-western shore, and rather open to winds from the west – hence the large and expensive mole under construction, which was still not finished. The coast of Spain was clearly visible less than 20 miles away from the town, and the mighty eminence of the Rock of Gibraltar rose above the horizon to the north-east. On anchoring in Tangier for the first time, Collins fixed the *Charles'* position with no fewer than four bearings and a transit: the two headlands, the Peterborough Tower at the top of the town, the site of the ancient settlement at the river mouth, and 'the ffountain just open of the mould† head'. With no leisure to do anything more elaborate by way of a survey, he took a sounding at each end of the warship's swing around her cable.

In ports where weather and time permitted, he surveyed the seabed with the lead line and wrote his own observations, composing pilotage notes and drafting sketch charts showing landmarks, off-lying dangers and soundings. He drew headlands and high ground from seaward as visual aids to navigation, and added the sort of practical information that would be useful to any newly arrived crew. In some ports, such as Alicante and Tangier, he also drew a general view of the place from the sea, showing the waterfront, prominent buildings and the hills behind, with ships lying at anchor in the foreground.

Seamen had been doing this sort of thing since time immemorial. The 'portolan' charts of the Mediterranean had been used since the medieval period, hand-drawn on vellum and often shaped like the animals they came from – goats were a convenient size – but the charts were predated by hundreds of years by *portolani*, or 'port-books', containing written sailing directions for navigators. The Portuguese had a word for them, *roteiros*, as did the French, *routiers*. The English called them 'rutters'. By Collins' time, the idea of combining text and sea charts in one volume was an established

practice, and printed sea atlases often contained detailed pilotage instructions.

It was these elaborate and expensive publications that he was emulating in his journals, and here we begin to see the origins of his *Great Britain*'s *Coasting Pilot*. He had a talent for a telling graphic. The Arctic volume that so impressed King Charles is full of sketches, some quite elaborate, such as the walrus and her calf, and the two-page landscape view of the bay in which they were shipwrecked. He continued to draw and sketch throughout his later voyages, and not always for the purpose of recording or imparting useful information. Sometimes it was merely decorative. Every time his ship came to anchor, he marked the event with a recumbent anchor in the margin. Approaching a landfall at the end of a long passage, when the lead line was deployed to plumb the depths, he would often highlight the occasion with a little doodle showing the lead attached to its twirl of twine. And if someone on board died, he was in the habit of drawing a hand in the margin pointing a telltale finger: 'In the night Thomas Harle being drunck fell from the foreyard down on the forecastle dead.'[30]

At Alicante, while the hands were heaving heavy rocks into the bilges, he took out one of the boats to sound the anchorage, setting the depths within a rough plan of the bay annotated with useful landmarks. As with most of Collins' other large-scale sketch charts of this period, it shows coastal features and harbours drawn in profile yet set upon a plan view of the shoreline, a technique that harked back to the conventions of an earlier age. But alongside those, firmly seated on a straight horizon, were numerous coastal profiles showing prominent features and landmarks, in a style that Collins had either seen in Waghenaer's maps, or in plagiarised copies of them, and which he would later use to great effect in his own sea atlas. It became part of the standard visual language of later hydrographers.

His chart of the Spanish port of Altea shows the bay in plan view, with soundings and a compass rose, fringed by a perspective rendering of the sea front and the mountains behind. The caption reads: 'You have two excellent markes to know Altea, first there is the gap at C which beareth West from you when you are in the road, this gap you may see many leagues off at

sea.’ This is the notch in the upper ridge of Puig Campana, which is indeed very obvious from seaward. There was also a red cliff to the west of the town and ‘another red cliffe or rock’ to the east. ‘Here is very good anchor ground and watering and wooding; wine, sheep, oynions, and ffoules indifferent cheape.’ The key to the map’s annotations reads: ‘A Altea Castle. B the River. C a remarkable gap on the mountain. D a vally. E a Red Cliffe.’

Such detailed work was for Collins’ own benefit, but was also shared with his fellow navigators. The ships’ masters compared notes. On one of the blank last pages of the journal Collins scribbled an aide-mémoire: ‘Lent Mr Phillips a map of Algier Bay, a map of Port Mahone’.* Off Cape Palos, a rock lurking 7ft from the surface had been newly discovered by a Captain Greene. Collins copied his notes on a loose scrap of paper, with due credit given, and later had it bound into the journal. Local knowledge was also sought, and sometimes shared: in the Bay of Alicante, Collins wrote, care must be taken near Cunny Island, so called by the English for its coneys, or rabbits.† You could sail between the island and the point, but ‘I advise none to enter that way except they are well acquainted, for there is a sunck rock, as the Spaniards say’. Surveying the coast near Cape Palos he fell into conversation with the keepers of the light on the point: ‘Here you may have wood and water, the Spaniards at the lighthouse being very civil.’

After their dramatic entrance to the Mediterranean theatre back in February, in pursuit of two Algerine frigates, the *James* and the *Charles* lapsed into a routine of convoy escort and patrol, in and around the Straits. The action always seemed to be happening somewhere else. On 1 July, with the English galley frigates sheltering from a strong easterly, a levant, in an anchorage south of Cape Spartel that they knew as Sir Jeremiah Smith’s Bay, a sail was spotted to seaward. They hauled up their anchors and chased after it, but gave up after three hours. Later that day they spoke with an

English merchant ship out of London, who told them that an Algerine had taken and burnt a Spanish thirty-gun frigate.

Everything changed when Sir John Narbrough returned to the Mediterranean theatre. Collins' old mentor, the Mediterranean commander-in-chief, had been in England since the previous year, while his second in command, Sir Robert Robinson, stood in for him. Having successfully subdued the Regency of Tripoli in his previous campaign, Narbrough was back to take the fight to Algiers.[31] At midday on Tuesday, 28 August 1677, the *Charles* was cruising in the mouth of the Straits along with the *Sapphire*, a thirty-two-gun fifth rate commanded by Captain Thomas Harman, when Narbrough's squadron hove into view, his admiral's command flag flying from the mainmast of the fifty-two-gun *Plymouth*. He arrived in company with the *Woolwich*, fifty-four, captained by Sir John Ernle, and the *Diamond*, forty-eight, commanded by Captain John Wood. They had three merchant ships under escort.

That afternoon the lookout spotted a sail in the west, and Narbrough immediately ordered the *Sapphire* away in pursuit: 'If she proved a Turk, to bring him into our fleet. Which if he refused, then to bring him in by fforse,' wrote Collins. 'When the Saphir came up with him she hayled him and found him to belong to Algier, who refused to hoyst his boats out. With that Capt Harman ffired into him. The Turk made sayle and out-sayled the Saphir.'

Being outsailed was a common complaint. It wasn't that the Algerian ships were particularly fast, but after months in the warm waters off the North African coast, Narbrough's ships were trailing streamers of weed from their bottoms, which drastically impaired their sailing qualities. There were no dry docks at hand for the English to use, nor even a friendly naval base for maintenance and repair. Even before he departed from England, Narbrough wrote to the Admiralty reminding their lordships to ensure that every ship sent out to serve with him should be fully equipped with stores and provisions, because everything was hard to come by in the Mediterranean.[32] 'They have not above ten days provisions each on board,' he reported of his ships on his arrival. 'I cannot proceed to Algiers nor

continue to cruise the sea to secure His Majesty's subjects for want of provisions and necessarys.'

He was not only sending the *Dragon* home for rudder repairs, he continued, but the *Assurance* and *Sapphire* were also in poor shape. Cádiz was closed to the English, and he hoped Mahón, in Menorca, would be more accommodating. If not, it would have to be Livorno, in Italy.[33] He needed elm board, deal, oak planking, blocks, cordage, bolts and nails. He warned:

> Last week I met with six Algire ships of warr in the Straits mouth they fired some shot at me and run from me taking slite notice of our ships, three of them had fifty guns aship and two or three hundred small shot. They are very full of people and faire ships of countenance – doubtless they will take severall of our merchants ships.[34]

Everything was more difficult in the Mediterranean. In the English Channel and the Narrow Seas, summer was the season for cruising and warfare. In winter, ships were laid up, their crews paid off and sent home. Officers went off to see to their country estates, or alternatively spent their months of idleness moping around Whitehall Palace trying to curry the king's favour.

In the Mediterranean, summers were longer, the winters less severe, and although the navy had victualling agents in Tangier and Livorno,[35] there were no friendly ports or bases where the English could lay up a fleet even if they wanted to. Ships remained in commission year round, and stayed at sea in virtually all weathers. London was a long way away, and with it the influence of the king and the Admiralty. Orders that could travel from Whitehall to the Downs in a couple of tides might take months to find the Mediterranean commander. The admiral in charge had to foster a spirit of self-sufficiency, both in the management of his ships and men, and in his operational decision-making. This independent mindset filtered down to the officers, as shared hardships engendered a feeling of brotherhood,

heightened by an awareness of being unwelcome interlopers in an area of the world where every foreign vessel they met was either an enemy, a past enemy, or a probable future enemy. This friendship and loyalty between the ships and their crews was stronger than the bond between the fleet and its masters in London – a situation that was to have far-reaching consequences. As Tangier was their first port of call on entering the Mediterranean theatre, they called themselves Tangerines.[36]

The return of Narbrough had a galvanising effect on the English fleet, his personal energy and dynamism a tonic to his captains. Collins was fired up, and a new note of purpose crept into his prose.[*] His entry for the Friday following the admiral's arrival set the tone:

> Anchor Tangier. A strong Levant. We turn'd into Tangier Bay & anchored, being now nine sayle of fryggotts and bound for Algier to demand satisfaction for their many abuses and initteries[†] done to his Majs and subjects, and if that they will not make satisfaction, then to make a warre with them in the meane.[‡] Our Admirall hath ordred his squadron to bring all Algier men of warre into Tangier, and if the Algiereens refuse to make satisfaction then to make such shipps prize.

A natural leader, one of Narbrough's qualities was to take a genuine interest in the men under his command, understand their talents, and put them where they could best be of use. Narbrough, of course, remembered Collins from their voyage to Patagonia, and now acknowledged him as a capable and experienced warrant officer. Collins, in turn, was inspired by his admiral. When, later in the commission, the *James* reported that her rudder irons had been eaten away to a dangerous degree, it was Collins that Narbrough chose to accompany him when he went to have a look. They discovered the rudder pintles to have virtually disappeared. Electrolytic corrosion was little understood, but they felt that the ship's newfangled lead hull sheathing was to blame. Collins surmised that the iron had been 'quite

consumed and eaten by the salt of the lead, or some other matter which corodes from the lead, that eats the irons and nayles'.

As night fell on the Saturday after Narbrough's arrival, the *Pearl* and the *Sapphire* set off from Tangier in pursuit of two ships seen entering the Straits, and in the morning brought in their prize, an Algerine of twenty-two guns. Robinson's *Assurance* came in at noon with the other, along with one of its three English prizes, another two having escaped behind Cape Spartel. Sir Robert sailed again next morning to try to find them. A few days later, Narbrough recaptured 'a Dutch fflyboate laden with pitch, tarr and dealeboard', while the *Sapphire* and the *Pearl* pursued the Algerine that took her. They caught it, after a long chase, and a bloody skirmish ensued. When next seen, the *Sapphire* was being towed around the headland into Tangier by the *Pearl*, having lost her masts and suffered five killed in action and sixteen wounded, among them Captain Harman. Collins heard that the Algerine came off considerably worse, with more than a hundred casualties, and her captain dead.

Narbrough sent his account of the action to London:

> The Algierene placed some unhappy shot into the Saphire and wounded the Captain and severall of his company, kill'd the master and four or five more, cut her rigging and wounded her masts so as all her masts fell by the board, the officers wounded, the sailors in a confusion cut all away, so as she lost every mast, yard, sail and rope that was above the upper deck, not so much as a block saved, they cut away the spritsail it being on fire. I never saw so confused an action in all my days, all for want of good seamen. Had not the Pearle frigate been near her the Algierene would certainly have taken her.

The loss of the masts, spars and rigging grieved him as much as the loss of the men.[37]

Captain Harman died of his wounds. Narbrough, who had earlier complained to Pepys about the quality of the lieutenants under his command,[38] took the opportunity to promote one of his favourites, the fiery young Cloudesley Shovell, who had sailed with him as a cabin boy, followed him from ship to ship, and led the harbour raid on Tripoli the previous year. The admiral rewarded him with his first command, the *Sapphire*. The *Plymouth*'s master was thus promoted to lieutenant, and chose the master of the *James* galley to serve aboard the flagship, while Narbrough moved Collins to the *James*, under Captain Canning. 'A strong Levant all day,' was Collins' only remark on the matter.

Within days both the *Charles* and the *James* found themselves in action.[*] The two galley frigates, along with the flagship, weighed anchor in Tangier Bay at six in the morning on 28 September. The *Plymouth*'s newly promoted master made an unhappy mess of things as a shift in the breeze caused the flagship to drift backwards into the bow of the *Newcastle*, carrying away her spritsail topmast and breaking her second bower anchor in its slings, although suffering negligible damage herself.[39]

The wind was light from east-north-east, the sky clear, and the sea calm. As the sun heaved over the high ground above the city and lit the filling sails of the Admiral's squadron, they stood slowly out to the west on a broad reach to join up with Sir John Ernle's *Woolwich* off Cape Spartel, who had come down from Cádiz with despatches for the admiral. In company, the *Woolwich* had two fireships and five sloops, and they were escorting a gaggle of inward-bound merchantmen. As Narbrough's ships headed westwards to the rendezvous, the light galley frigates stretched out a lead over the rest of the squadron. Then at eight o'clock came the sound of cannon fire, drifting down on the wind from the direction of the Spanish shore.

'We herd severall gunns to the eastward, and prisently saw a shipp coming out of the Straits and another shipp chacing after her and keeping firing of gunns,' Collins recorded in his journal. 'Which we supposed to be the Portsmouth chaceing of an Algiereene Close alongst the Spanish

shoare.’ The flagship and her consorts steered north to intercept the Algerine before she could escape into the Atlantic.

Already 3 miles downwind of the heavily armed *Plymouth* and *Woolwich*, the light and nimble *Charles* and *James* galleys hauled up towards the Spanish coast with the rest of the squadron, on a parallel track. The Algerine, a powerful frigate of forty-four guns, held his westward course as the English ships drew closer, Narbrough’s squadron teasing every ounce of thrust out of their sails to close the gap. The pursuing *Portsmouth*, a forty-six-gun fourth rate, kept up a hopeful harassing fire using her bow chasers. With Cape Trafalgar about 6 miles off in the north-west, and the distance narrowing between the hunters and their quarry, it became clear to the Algerine captain that Narbrough was going to succeed in shutting the gate. He put his helm hard over, sheeted home and steered southwards for the African coast on a broad reach. Ernle and Narbrough aboard the *Woolwich* and *Plymouth* had anticipated the move, tacking their ships ponderously through the faint breeze just in time to let fly at him with their port broadsides as he glided past. The Algerine returned fire, but with no observable results on either side.

By now the sun had climbed into a cloudless sky with little prospect of a stiffer breeze to give the heavy English ships an advantage. A rapid sailer and well-handled, the enemy frigate began to pull ahead of the *Plymouth* and *Woolwich*, which plied their chasers in hopes that a lucky shot might bring down a mast or spar.

The *James* and *Charles*, meanwhile, had tacked together and were also heading southward, ahead of the two third rates and on a parallel course, well downwind of the Algerine. They were beyond accurate gunnery range, but stood between him and the Atlantic, should he try again to break out. The *Newcastle* and *Portland*, meanwhile, now clear of the Bay of Tangier, had heard the commotion and seen the smoke. Spotting the Algerine frigate in the distance, bearing down towards them under a press of sail, they steered north-west, intent on heading him off and pinning him between their two broadsides.

Now with two English fourth rates in front of him and the hundred-plus guns of the *Plymouth* and *Woolwich* in pursuit, the Algerine captain was faced with an impossible choice. In these light airs the situation changed slowly, but he knew that one wrong move could seal his fate. He could haul his wind again and try to beat back through the Straits, but if he did so he could hardly be sure of weathering the African shore – and if the wind veered, forcing him to tack to the north, he would deliver himself into the hands of the English. His other option was to turn to the west again, cut across the paths of the pursuing *Plymouth* and *Woolwich*, fight his way through the two galley frigates, and try to outrun them all until nightfall. The sun was still high, but well on its way to the western horizon. It was his best chance.

He put his helm over and ran downwind, with just the *James* and the *Charles* between him and the safety of the open Atlantic. Bearing down on the lightly armed English fourth rates, the Algerine captain's plan required cool judgement and not a little luck. The range closed and still he stood on, towards the waiting muzzles of the galley frigates' five-and-a-quarter-pounders. The moment before the English could fire a raking volley into his bow and along the length of his deck, he luffed up to bring his own port broadside to bear. All three ships let fly with their cannon and small arms, and with the English ships engulfed in smoke – their own and the enemy's, drifting down on the breeze – the Algerine resumed his course and made to slip past behind them. Alert to the danger, the English wore round and let fly with their unused starboard broadsides, as the three adversaries fell into a running battle at close quarters on parallel tracks. A ball shattered the *James'* foreyard near the parrel, disabling all her headsails. At almost the same moment a shot from the *James* brought down the Algerine's main topmast. A ball from the *Charles*, her own foreyard splintered and foresails flapping, cut his forward topgallant sheet and slowed him further.

Seeing how well the English sailed, the Algerine commander had second thoughts about trying to escape into the open ocean. The damage he had inflicted on the two galley frigates would hardly affect their speed downwind, and there were still three hours to go before sunset. But he

might be able to outrun them on a reach. As he made one last desperate bid to save his ship, the *James* was waiting, Captain Canning commanding the guns and Greenvile Collins bellowing his steering orders down to the helmsman over the cacophony of battle. The Algerine put his helm over, trying to run under the English sterns for Cape Spartel. It was his last hope. But Collins was ready, and the *James* followed her every move, hardening up into the breeze and closing the gap to port until the hulls of the two ships crunched together.

'We clapt him a board, giving him a broad side and volley of small shott, and entred our men,' wrote Collins afterwards. But just then the *Newcastle*, coming up clumsily on the other side and eager to join the action, fouled the *James'* bowsprit and sheared her away, leaving behind the few men who had managed to leap across. In his account of the action, over on the *Charles*, Captain Hamilton reckoned that there were thirty or forty of the *James'* men marooned aboard the heavily manned Algerine and fighting for their lives.[40] Then the *Charles* arrived, not a moment too soon, making fast to their quarry and swarming her own men across to the bloodied enemy deck. Hamilton wrote:

> Seeing ye Turks driveing and killing ye James his men, and some of them leap overboard, I sprung my luff and clapt him aboard on ye starboard quarter, which brought him alongst my side. My Lieut entred him with one hundred and seventy men at ye least.

It took more than an hour of ferocious fighting before the *James'* and *Charles'* men could subdue the Barbary frigate's crew, who continued the battle below decks. Out of her 380 men, including fifty Christian slaves, Hamilton estimated that 180 were killed 'and most of ye rest were woulded'. The *Charles* suffered twelve dead and thirty wounded, while the *James* had ten fatalities, including Captain Canning, felled by a musket shot. The Algerine ship was called the *Golden Marigold*.[*] Her captain was also among the dead.[41] He turned out to be a 'renegadoe' – a mercenary –

from Hamburg,[†] whose probable fate, had he survived the battle, would have been summary execution.[42] 'They fought very courageously both betwixt decks and in ye hold,' wrote Hamilton.

After the battle, Collins supervised the rigging of a jury foresail and they eased the battered *James* across to the anchorage in Sir Jeremiah Smith's Bay. She had suffered cruelly. It took a week before she was in a fit state to sail round to the mole in Tangier. They buried Canning at sea on 2 October, 'by reason that his boddy would not keep any longer', while Captain Wyborne from the *Pearl* was transferred to command the *James* in his stead.

Narbrough did full justice to his forces in his report of the action to the Admiralty, and the galley frigates' exploits so pleased the king that he decided to have two more built on the lines of the *Charles*.[43] Narbrough also acknowledged the valour of their opponent:

> After the Turks upper deck was taken the Turks maintained the gun deck more an hours time, resolving to fight it out to the last man. Our ships are much undermanned for this service, I am doubtful we shall have some of our ships taken from us by these fellows. They are resolute and understand fighting & have good ships.[44]

But as ever, his main concern was maintaining the fighting effectiveness of his fleet: 'In case Yr Honours do not supply me with masts, and all manner of other stores and provisions, I cannot tell what course to take,' he warned. 'I want more friggts to carry on this war, and the freedom of the port of Cádiz and Port Mahón to careen our ships.'

Collins was also transferred again. Soon after the capture of the *Golden Marigold*, the master of the *Newcastle* was tried at a Council of War for running his ship aground near Cape Malabata. For his punishment he was

rowed around the fleet tied to the boat's mast with a placard around his neck proclaiming his crime, and then put ashore in Tangier.[‡] Collins was promoted to take the hapless warrant officer's place, moving aboard the *Newcastle* on 20 October, under Captain Gustavus L'Holstein. Unlike the rather cursory reference to his previous promotion to the *James*, here he marked the occasion with a newly trimmed quill and a new page of his journal, headed 'NewCastle Frygott at Tangier' with a certain flourish: 'I was ordred by the Adm Sr John Narbrough to be master of the Newcastle ffrygott.' Galley frigates were all very well, but they were no match for the punch and prestige of a forty-four-gun fourth rate – a proper two-decker. His cabin felt positively palatial, although he still couldn't stand up in it.

Collins was clearly proud to serve under Narbrough, but not everyone held the admiral in such high esteem. In Captain Hamilton's account of the battle, in a letter addressed privately to a noble patron, the Earl of Ossory, the frigate captain suspected that his commander-in-chief was not giving him the credit he was due: 'I thought Sr Jn Narbrough might have bin so kind to have writ ye truth of ye business, but I find he is only self interest'd. I will say no more.'[45]

The main issue for Hamilton was money. If bought into Royal Navy service, the *Golden Marigold* was worth 10*s* per ton to the men that captured her, and £6 13*s* 4*d* per gun. As captain he would be entitled to half of this prize pot of around £450, when a fourth-rate captain's annual salary was £126.[46] The Algerine's surviving crew were also worth money as slaves. Hamilton wrote his letter more than six months after the battle, when the captured prize had still not been dealt with by the Admiralty court, even though it was already sailing as part of Narbrough's Mediterranean fleet, commanded by the young Lieutenant – now Captain – Dunbar. But it was officially bought into Royal Navy service soon afterwards,[47] so it seems Hamilton's appeal did the trick.

Collins' latest move was certainly a promotion. She might have been the same rate as the light galley frigates, but the *Newcastle* was a much more substantial ship, with deeper draught, significantly broader beam, and capable of hurling almost five times their broadside weight of metal thanks

to a formidable battery of twenty-four-pounders on her lower deck. She was more than 20 years old, however, built during Cromwell's Protectorate and a veteran of many battles with the Spanish and the Dutch. Her grounding on the African shore had also done nothing for the state of her timbers. In the absence of any proper naval bases in the Mediterranean, the English had taken to using the friendly and cosmopolitan Tuscan free port of Livorno when any serious refitting became necessary, where well-stocked chandlers and skilled shipwrights were to be had.

The squadron sailed from Tangier on 27 October and called in at Málaga, where Collins took the opportunity to borrow the longboat and practise his surveying skills, producing a sketch chart of the bay that showed the town's waterfront and the hills behind, and indicated the positions of the mole, the castle, a light tower, and a place to get fresh water. At Alicante they were refused permission by the governor to fill up their water casks, so they sailed on to Altea. Here Narbrough managed to assemble virtually his entire fleet of eight frigates, including the *Charles* and *James* galleys, and two fireships. Although bound for Livorno to refit, Narbrough planned to call in at Algiers on the way, where he would back up his diplomacy with a show of force.

They set sail on 19 November, and dropped anchor in the Bay of Algiers on 23 November. The English ships must have made an imposing sight lined up off the town in 30-fathom water, but looking down from the thick stone walls of the kasbah, the Dey was not impressed. Winter was now upon them, and the English Mediterranean fleet was starting to show the strain of keeping the sea in all weathers. Narbrough informed the Lords of the Admiralty that the campaign against the Algerines was not going well, and he would be taking his ships to Livorno to prepare them properly for the next bout: 'I will use my endeavour to annoy the Algerians as much as possible and give what protection I am able unto his Majs subjects.'[48] He would lay up their various prize vessels as 'they are not able to keep the sea longer their sails being blown to pieces and they are very leaky', and sell their captured crews as soon as he could, for they were infectious, dying daily, and expensive to feed.

They stopped off for wood and water at Cagliari in Sardinia, which was then under Spanish rule, sold the prisoners in the slave market, and returned a recaptured Spanish settee – a lateen-rigged coaster – to its owners in the town. The *Newcastle* dropped anchor in Livorno Road on 30 December and moved closer in to the mole head the following morning. Collins wasted no time: 'Moared in 6 fathom water, the Lanthorne* bearing SE and the Powder house NEbE. In the afternoone unbent our sayle, got down yards and topmasts, and made preparations to get out our gunns.'

To refit in the open, with the ship afloat, was a Herculean task. The *Newcastle* was more than 130ft long, excluding her bowsprit, and 33ft in the beam. Her draught at the stern was 16ft. Each twenty-four-pounder on her lower deck weighed 21/2 tons and had to be hoisted gingerly through the hatchways, into a boat, and onto the mole. One mistake and it would plunge right through the bottom of the ship. There was no dry dock, and with a tidal range in Livorno of only a couple of feet, no prospect of careening the hull on the hard. She had to be heeled over while afloat, by hauling on lines led from her masts to the mole, and the first time they tried it she took in so much water through her tightly closed gunports they had to give up the attempt. Caulkers, already at work on the deck and on the hull and bottom planking, sealed the ports shut with oakum and hot pitch.

The refit took two months. The *Newcastle*'s keel was in worse shape than they had feared, 'much damnified' in Collins' phrase, and extremely difficult to get at. But, working from boats under the hull, they managed to bodge together a repair using nailed-on lead sheets and deal boards, liberally caulked, and eventually sailed from Livorno on 12 March, in company with the *James* and fifteen merchantmen, bound for Naples.

With normal shipboard routine restored, Collins sketched and made notes as they went. On the way into Livorno, back in December, he had found the island of Capri to bear north-west from the end of Elba, and not north, as the charts had it. Now, sailing southwards past the Pontine islands, he discovered a new one, that wasn't marked on either his English or his Dutch charts.

At Naples they anchored ‘right against the city’ in 20 fathoms, according to Collins’ slightly incredulous note, the castle bearing north-west by north.

Naples was an astonishing spectacle. Collins had seen nothing like it. Of course, London was both wealthier and more populous than the diminutive Italian kingdom, but Collins knew the English capital as a city of stinking low-tide mud and freezing winter fogs. For sheer visual drama it could not compete with Naples’ castles, royal palace and stone-built arsenal, its deep-water anchorage and its colourful waterfront, the whole tableau spread out beneath a cloud-flecked vault of Campanian blue. There was even a volcano. Bringing a 600-ton king’s ship to anchor beneath the walls of this great Renaissance city must have felt like sailing into a stage set.

And yet, even as he gazed up at the sight from the deck of his shabby, leaky man-of-war, the salt-stained English navigator must have sensed the turning of a page. Spread out before him was the old world, a place of Papists and primitive sea charts inscribed on animal skins, where they were so fearful of any challenge to the established orthodoxy that they had been known, on occasion, to lock up their astronomers. Indeed, Galileo’s inquisitors refused to look through his telescope because they did not want to see things the Bible said did not exist.[49] In England, it was true, they sometimes went to war with each other, and occasionally beheaded their kings, but the very presence of the battered old *Newcastle* in front of the Italian city’s walls did present a visible challenge to the old order. And here he was, her master, someone who was constantly reaching for his backstaff, his lead line or his compass to measure everything he saw around him – a man of science. The coffee houses at home were filled with the chatter of writers and astronomers and natural philosophers, seeking answers to all the questions in the world. Maybe London wasn’t much to look at – pungent, cold, and, since the Great Fire, rather charred – but it was alive.

Facts and figures were Collins' professional stock in trade. By personal inclination a voracious collector of knowledge, in this he was a creature both of his time and of his town, which was a place of magpie intellectualism where the new spirit of scientific enquiry lived side-by-side with age-old superstitions. So little was actually known that almost anything might mean something. When a whale was washed up in the Thames, the Deptford diarist John Evelyn felt it might be a portent, because the last time it happened, 'that yeare dyed Cromwell'. And yet he still recorded its dimensions, drew a sketch, marvelled at the width of its mouth and the narrowness of its throat, and wondered how a creature so large could survive on 'slime' filtered through its whalebone. At the Royal Society, Evelyn heard one Dr Croone describe the freezing of water: 'An instantaneous action or operation, so as listning attentively, one may heare a kind of obscure sharp frizling noise when it shoots the icy skin or first Epidermis which is swift as thought.' The intellectual tenets of what would come to be known as the Enlightenment were starting to spread through educated English society.

Curiosity was the thing. Like his mentor Narbrough, Collins had it in abundance, uninformed and undiscriminating. Everything was worthy of note, from oddly shaped icebergs in the Arctic to a waterspout he saw off Algiers:

> At noone I saw a spout descend out of a cloud, growing bigger and bigger and descending lower and lower, and lasted about six minutes and then vanished away by degrees, and then gathered into a round cloud of a black collour & turning round as it past away with the wind amongst the other cloudes, but much faster, and in this round form continued about 4 minutes & then vanished away.

Along with his observations of the natural world, he filed away factual snippets that looked interesting, or that might come in useful, as his three old manuscript charts of the Indian Ocean unfortunately never did,

following the failure of the Arctic expedition. Before he set out for the Mediterranean, he copied out a short extract about the town of Salé from *Baker 's Chronicle*, a history published in 1643.[50] He had no idea if he would ever go there, but there was no such thing as useless knowledge.

He also brought with him on the voyage a copy of *Sandys Travels*, a popular account of a journey through the Mediterranean, written by the English author George Sandys, first published in 1615 and reprinted several times since. Awestruck by the majesty of Naples, Collins made full use of the book, copying out large chunks of it over several pages of his journal. He took down Sandys' accounts of the history, geography and economy of the city wholesale, but also paraphrased, edited and occasionally corrected the text.

When writing about Italy, the classically educated Sandys referred constantly to Roman history and myth, much of which Collins cut out. He was equally loquacious about the Greeks. Sandys stated that the Roman-built Tunnel of Sejanus, which cuts through the hill of Posillipo, 'passes under the mountaine for the space of six hundred paces (some say of a mile)', which suggests that he didn't actually pace it out himself. Collins corrected that, accurately, to 'an English half mile', which suggests that he did. Sandys' retelling of a local legend about some hot springs involving Saint Germain, two sixth-century popes and a tormented soul, was summarily dismissed by Collins as a 'large and foolish story of the Papists'. And where the censorious Sandys suggested a figure of thirty thousand for the number of prostitutes in Naples, Collins for some reason amended it first to ten thousand, before crossing that out and settling for twenty thousand. Perhaps he consulted the hands.

The *Newcastle* spent just six days anchored before the city walls. While her master probably didn't get to do as much sight-seeing as he would have liked – writing out long screeds of Sandys in his fair copy journal was no doubt a later consolation – he did find the time to explore Vesuvius. 'We rid up on mules as far as C,' he wrote, referring to his annotated plan and profile views of the mountain, 'and there left the mules, and with much trouble and paines ascended to the top, where we lookt down into the

concave.' He judged the caldera to be 5 miles around, and 600ft deep, and saw its cone at the bottom belching smoke and flame. He used a separate sheet for his sketch and description, and had it bound into the journal among his borrowings from Sandys. Giving credit where it was due, he concluded his Naples account with: 'For a further relation hereof I refer you to Mr Sandis Travells.'

The *Newcastle* left Naples on 22 March, escorting eighteen sail of merchant ships as news came through that the French, in their war with the Dutch, had abandoned Messina in Sicily. Two Dutch privateers came in with two French prizes. 'They tould us that us that the ffrench had left the citty in demolished conditions,' Collins noted. 'Calm all night'.

And calm it remained for several days. As the *Newcastle* drifted, in sight of the city and its volcano, her master sketched the islands in the offing: Procida, Ischia, Capri.

The dismissive attitude towards Catholicism that Collins affected in his journal was in all probability a true reflection of his religious convictions. After a century and half, the Reformation had written itself through all aspects of English life, from language and thought to art and architecture. Indeed, looking at the charts that Collins was soon to produce, their graphical clarity and absence of adornment makes them seem almost ascetic next to the exuberance of the previous age: the cartographical equivalents of the new churches springing up in London on the foundations of their burnt-out, medieval predecessors. Collins' objections to the culture of Catholicism were perhaps as much aesthetic as religious.

But an anti-Papist attitude was also a sensible stance for an Englishman to adopt in the 1670s. It was a febrile period for religious politics. Since the Reformation, Catholicism had been the necessary evil angel in English Protestantism's creation myth,[51] held responsible for an attempted Spanish invasion in 1588, the Gunpowder Plot in 1605, and numerous atrocities

detailed in the gruesome woodcuts of John Foxe's best-selling *Book of Martyrs*. A national holiday was celebrated every 5 November. On Queen Elizabeth's Day, drunken revellers burnt effigies of the Pope. The plague of 1665, and the Great Fire of London the following year, were blamed routinely on Papist conspiracies. The Civil War was at least partly a religious conflict, and one that Collins was old enough to remember personally.

Numerous laws had been enacted to stifle dissent, aimed at Protestant non-conformists as much as Catholics, as successive Stuart kings attempted to tread a line between puritanical Presbyterianism, which was particularly strong in Scotland, and the Catholicism of England's powerful rival across the Channel. There had been repercussions for the navy. When King Charles' brother James converted to Catholicism, the public outcry led to the 1673 Test Act, which specifically excluded Catholics from public appointments by requiring all office holders to disavow the notion of transubstantiation, the belief that communion bread and wine were the actual blood and body of Christ. James resigned his position as Lord High Admiral. Charles took over the role, assisted by a new Admiralty Commission, with Pepys as its secretary, but James continued to exert an influence on naval matters from behind the scenes.[52]

Given that his journal was open to inspection at the end of the voyage by the Lords of the Admiralty, it was sensible for Collins to leave no shred of doubt as to where its writer's religious loyalties lay. He made a particular note of 'Gunpowder Treason Day' on an otherwise uneventful 5 November 1678, as they lay at anchor in 11-fathom water off Alicante.

He hadn't thought to mention it the previous year, but by this time he had been promoted again, and had perhaps acquired a greater sense of its political import. For by now he was navigator to the admiral himself, and master aboard the flagship of the Mediterranean fleet. Working directly for Sir John Narbrough aboard the *Plymouth* not only gave Collins a higher profile, but also placed him at the centre of operations, privy to official communications and high-level rumours alike. He might also have been advised by Narbrough, his old captain and mentor, that the level of paranoia

in London was such that it would be prudent to make it quite clear whose side he was on.

On 14 December, dispatches arrived bringing news from London of the Popish Plot, an alleged conspiracy to kill the king that was propagated by one Titus Oates, a cleric, charlatan and the very definition of a loose canon. The fleet was anchored in Mahón, Menorca, where the hands were busy helping careen the *Nonsuch*. 'Popish plot discovered in England,' Collins wrote, alongside a margin note:

> Arrived a small vessel from Mercellia,* laden with salt porke and Callivances† for our fleete. Sr Jn Narbrough received a Packquet by this vessel, which gave account that the papists had conspyred the death of the King, and that the plott was discovered and many persons apprehended and imprizioned.

As the men tucked in to their cassoulet, they could not have known that the Popish Plot was wholly fictitious, but they could easily imagine how it had thrown England into a panic. Those few Catholics in the fleet, such as Sir Roger Strickland of the *Mary* third rate, were well used to casting furtive glances over one shoulder.* They would now be looking over both. Back in England, several entirely innocent suspects were executed, although Oates himself, who made many of the false accusations, escaped the scaffold.

As well as cordage, tar and timber, Narbrough was also short of qualified officers. His latest reshuffle had begun when he sent his lieutenant off to command a captured Algerine frigate. The *Plymouth*'s master then stepped into the lieutenant's shoes, but initially no new master was appointed. En route from Zant† to Messina on 11 May 1678, with eleven frigates escorting a twenty-four-strong Smyrna‡ convoy, Narbrough realised he needed a reliable specialist master and navigator. Collins was his pick.

'I was removed into the Plym under the command of Sr John Narbrough Kt and Adm of his majs fleet in the Mediterranean,' he wrote, the journal barely skipping a beat. No sooner had he moved his dunnage, instruments

and charts on board than two strange sails were spotted and Narbrough immediately sent off four of his frigates to investigate. That evening an English merchant ship told them of a victory – HMS *Rupert* had taken an Algerine of fifty guns. The *Rupert*'s captain was Arthur Herbert, a future Mediterranean commander-in-chief who was destined for even greater things.[§]

Collins served in the *Plymouth* for fourteen months. He had been aboard before, to attend councils of war, and no doubt on the occasional harbour visit, but actually living on the Mediterranean flagship gave him a close-up view of the business of fleet command. It was never dull, and nothing was too trivial for his journal. One day Captain Wood came in from the Spanish side of the Straits with the news that the *Foresight*'s yawl, thought lost, had drifted safely into Cádiz by itself. The flagship chased a flotilla of Algerine frigates one afternoon, one of which took refuge in a bay as night was falling. 'It being then half an hour past six a clock and very dark, with little wind at NNW and a great northern sea which heaved us in upon the shoare soe that we durst not venter further in,' Collins wrote. 'Had we but half an hour more light we [would have] certainly destroyed her.' Next day the *Plymouth* retook from the Algerines a London ship that had been captured on its way home from San Remo with a cargo of lemons.

While the *Plymouth* lay at anchor in Tangier, word came from the governor that the surrounding Algerian soldiers, under a flag of truce, had put in an unusual request. They wanted some English drums, and wondered what the English admiral might accept in exchange. Narbrough replied that he wanted to go ashore and gather brushwood, for breaming the hulls of the frigates careened alongside the mole – cleaning off weed and barnacles with fire. Permission was granted, and Narbrough went ashore himself with a party in several boats 'betweene Whit Bay and Jewes River, and there cut as much brush as would Creen one ship'. The very next day, however, the commander of the *Emsworth* sloop, Mr Broome, with seven of his men, disappeared near Cape Malabata. They had been gathering firewood on the beach and 'were surprised by the Moores and carryed away'.

Collins was undiscriminating in his accounts of all the happenings. Plague had broken out in Málaga. The *Plymouth*'s longboat was stolen in Tangier Bay in the darkness, and her boatswain injured. Collins roused out three of the *Plymouth*'s rotting old sails and condemned them, and was sent aboard the *Royal Oak* to survey a mouldy cable. He condemned that too, along with 'fifteen butts of stincking beere'. A lone Irishman arrived in Mahón after escaping from Algiers in a small boat, and became an instant celebrity, 'having bin nine dayes in his passage, and met with much bad wether, soe that it is thought by all persons, that there was never the like attempt before, with such great successe'. The *Mary*, damaged in a storm, was sent home for repair, so Narbrough's third in command, Rear Admiral Sir Roger Strickland, removed with his flag to the *Bristol*. The flagship's pinnace, surveying the shore near Algiers, chanced upon a man waving from the beach and took him off – a Spaniard who had been a slave in the city for six years. News arrived with some English merchantmen that several of the Popish Plotters had been executed: 'God make us thanckfull for his great mercys in discovering there bloody treason against our King and Prodistant Religion,' noted Collins solemnly.

There were frequent courts-martial. A man and a boy were tried aboard the flagship for the crime of sodomy, but nothing could be proved. They were dismissed the service. Two men were hauled before the admiral for striking their lieutenant, 'for which they were ordred to be whipt from ship to ship'. Mr Pearce, the purser of the *Pearl*, received a fine for embezzling provisions he had received at Livorno. Men from the *Centurion* and *Hampshire* were found guilty of stealing from French and Spanish ships, and sentenced to a flogging around the fleet and having their pay stopped. At a single hearing in October 1678, the master of the *James* was derated for abusing his lieutenant, four seamen were 'whipt from ship to shipp' for running away, and one man was sentenced to a whipping 'for threatening to blow the Portland up'. Given the relative leniency of his punishment, he was no doubt thought to have been more drunk than treasonous.

The *Golden Marigold*, won for the Royal Navy at the cost of so much blood barely a year before, was driven ashore from the Tangier anchorage

during a storm in January 1679. At the subsequent court martial young Captain Dunbar was found blameless, being ashore at the time, but her lieutenant and master were pronounced guilty posthumously – they had drowned in the shipwreck, along with more than fifty men.

Throughout all this Collins never lost sight of his primary role, as the senior navigator in a fleet whose navy still had a lot to learn about the Mediterranean. He maintained his careful attention to navigation, pilotage and record-keeping, correcting errors where he found them – his own and those of others – noting local phenomena, sketching headlands and islands, and offering advice to those who might be following in his wake. Sailing between Elba and the Italian mainland, and doubtful of the veracity of his printed charts, he made the accurate observation that 'from the east part of Elba the island Gigio[*] beareth SEbS about 13 leagues'. Soon afterwards he was able to correct another discrepancy, off southern Calabria: 'We saw land to beare SE and SEbS, but in the Charts the land is laid down ESE'.

Currents and tidal streams in the Mediterranean were a particular problem, all but unknown to English navigators. The ferocious currents in the Straits of Messina, between Sicily and the Italian mainland, were quite literally legendary, but at least the solution was straightforward: after describing their behaviour in relation to the moon's cycle, Collins noted that 'neare the shoare on both sides there are very strange Aydies,[†] whoes motion is not known but by the Pylotts of this place'. He then simply advised every captain to employ a pilot.

A month after joining the *Plymouth*, on passage between Livorno and Menorca, he thought he might be allowing too much offset for leeway, but by the next day he had established that the true culprit was a south-going current. On another occasion, having spent the night hove-to off Gibraltar, they found the Rock at dawn to be considerably closer than they expected: 'the currant last night having set us to the westward 4 leagues'.

In March 1679 the *Plymouth* was at anchor off Alicante when Narbrough received orders to victual his ships in Port Mahón and return to England. After one more fruitless attempt at diplomacy with the Dey of Algiers, the admiral sailed to Menorca to gather his fleet together,

summoning all the commissioned officers and warrant officers aboard the flagship ‘to receive the Sacrement and take the Oath of Allegiance and Supremesie’. The atmosphere of anti-Catholic suspicion and distrust that had flared up with the news of the Popish Plot was more heated than ever.

‘In the morning sprung up a handsome gale at ENE,’ wrote Collins on 16 May, his choice of adjective reflecting the buoyant mood on board as the ship heeled over, close-hauled, and salt spray doused her decks. Two years and eight months since receiving his orders to report aboard the *Charles* galley frigate, he was homeward bound. Narbrough’s flagship sailed at the head of a seventeen-strong fleet: ‘eight saile of men of warr, two fire shipps, four sloopes, the stoare ship, the hulk and a prize’. The *Plymouth* had cleared the Straits and was drawing level with Cape St Vincent, bearing east a half north about 3 leagues off. ‘I make ye Cape to ly in 37d 00 nearest,’ Collins noted of the landmark’s latitude, ‘and to differ in Longitude from Tangier 3-03.’ The four-day passage from North Africa had served up variable but largely contrary winds, while as the lead ship, the *Plymouth* had been obliged to keep the convoy together and shepherd the slowest ships along, presenting her navigator with innumerable changes of course and speed to keep a note of. Yet after all that, his error in the longitudinal distance between the Cape and Tangier was just 7 miles. It was an impressive feat of navigation.

Where conditions had been close to perfect for the outbound passage from England, it was a different story heading home. The ‘handsome gale’ from the east soon let them down. It backed into the north and stayed there, blowing hard all the while and forcing the fleet out into the Atlantic, first to steer clear of Cape Finisterre and then to avoid becoming embayed in Biscay. After thirteen days, by Collins’ reckoning, they had clawed their way northwards by less than 300 miles. Two days of calms added insult to injury before the wind finally freshened from the west and south-west, pushing the weary fleet onwards towards the English Channel.

Collins’ navigational antennae were twitching as his ship closed with the distant coast. Clues to its proximity could come from anywhere – the scend of the sea, the colour of the water, the smells in the air, or the

seabirds. It was a situation where the experience of the navigator could count for more than his expertise. Passing ships could come in handy, too. On 30 May, a Friday, they ‘spoake with a Dutch shipp which came from Amsterdam, and was bound for Suranam’. The following Sunday they met a six-ship convoy bound for Tangier under the protection of HMS *Leopard*, and hove to for several hours while Narbrough and his officers compared notes with their opposite numbers in the outbound man-of-war.

In one of his rare sea voyages, Samuel Pepys was fascinated to watch the workings of a man-of-war in the approaches to the English Channel. He was a landlubber, but a perspicacious one. ‘Strange the disagreements,’ he wrote, noting that some of the officers thought they were to the west of the Scilly Isles, others to the east. Some were worried about running ashore on the Brittany coast, while others fretted about piling into the rocks off Cornwall. He could see that the charts were at fault, because they didn’t agree with each other, but there were many other variables, not the least of which was the ‘difference by some minutes by their observations in their quadrants, so as nothing appears certain among them.’[53]

If Pepys had been a navigator he would have known, of course, that certainty was not to be trusted. In such situations the navigator could only be certain of what he didn’t know, which left him no choice but to put his hard-earned practical and mathematical skills to one side and call upon knowledge that could only be accumulated with years of sea time. This may have been placing art before science, but it was nevertheless a rational process, an intellectual exercise dedicated to sifting the possibilities before arriving at a decision – his best guess – upon which he had to be prepared to gamble the ship.

At eight in the morning on Tuesday, 3 June, in a howling gale from the south-south-west and ‘thick, cloudy wether’, Collins ordered the lead to be cast – 75 fathoms, with a bottom of fine sand – and told the quartermaster to steer north-east. They were getting close. At noon he was unable to get a sun sight through the low scudding clouds, but working from the previous day’s observation he estimated their latitude to be 49° 7’N. According to the charts, that put them level with Jersey, and therefore safely to the north of

the off-lying rocks and swirling tidal streams of the iron-bound Brittany peninsula. By the log they had covered 124 miles in the last twenty-four hours.

In the afternoon visibility worsened. At four o'clock he ordered the lead cast again – 65 fathoms. It was five days after the new moon. Poised between spring and neap tides, the stream at the mouth of the Channel would run at up to a knot, making a full circuit of the compass card between one high tide and the next. The only thing Collins could be entirely sure of was the depth of water beneath their keel – and that, he knew, put them within about 80 miles of Land's End and the Lizard, and closer yet to the Isles of Scilly. They had plenty of sea room still, but with night coming on he could not risk closing that tide-swept coastline lest they make their landfall in the dark, to the terrifying sound of surf pounding the Cornish cliffs.

They were safe where they were, so as darkness fell, he ordered the ship to heave to. There they lay, sails backed, making no headway but borne back and forth on the tide until two in the morning, when the clouds parted. The sky was already beginning to lighten. Collins ordered the yards swung round and put the ship on a north-easterly course, where he knew the sun was due to rise in just over two hours. A fine day dawned. At eleven o'clock, the lookout hailed from the masthead: Land's End, bearing north, about 6 leagues. A perfect landfall.

Sandys Travels,

CONTAINING AN

HISTORY

OF THE

Original and present State of the *Turkish* EMPIRE:
Their Laws, Government, Policy, Military Force,
Courts of Justice, and Commerce.

The *MAHOMETAN* RELIGION and CEREMONIES:

A DESCRIPTION of *CONSTANTINOPLE*,
The Grand Signior's *Seraglio*, and his manner of living:

ALSO,

Of *GREECE*, With the RELIGION and CUSTOMS
of the *GRECIANS*.

Of *ÆGYPT*; the Antiquity, Hieroglyphicks, Rites, Customs,
Discipline, and Religion of the *Ægyptians*.

A VOYAGE on the River *NYLUS*:

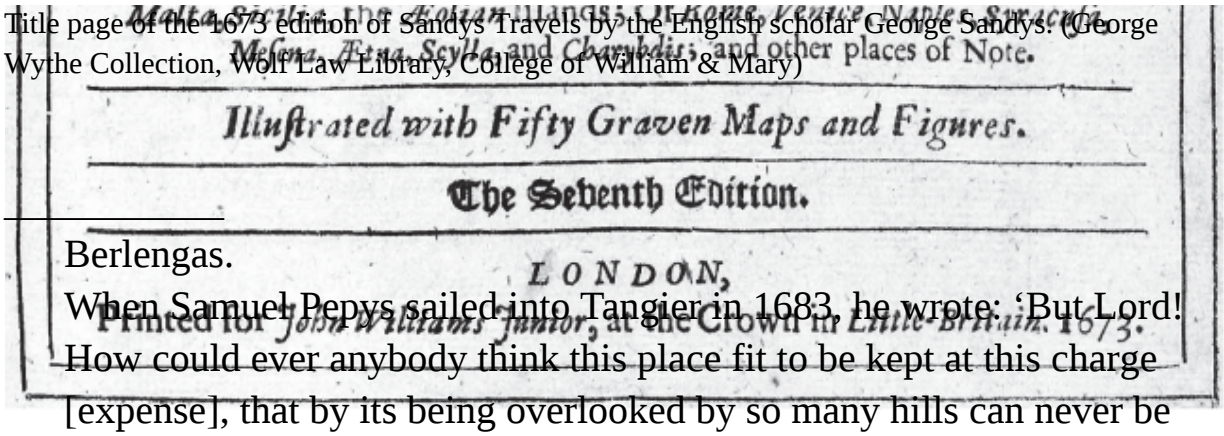
Of *Armenia*, *Grand Cairo*, *Rhodes*, the *Pyramides*, *Colossus*;

The former flourishing and present State of *ALEXANDRIA*.

A Description of the *HOLY-LAND*; of the *Jews*, and several
Sects of *Christians* living there; of *Jerusalem*, *Sepulchre* of *Christ*,
Temple of *Solomon*; and what else either of Antiquity,
or worth observation.

LASTLY,

ITALY described, and the Islands adjoining; as *Cyprus*, *Crete*,


Title page of the 1673 edition of Sandys Travels by the English scholar George Sandys. (George Wythe Collection, Wolf Law Library, College of William & Mary)

Illustrated with Fifty Graven Maps and Figures.

The Seventh Edition.

LONDON,

Berlengas.

When Samuel Pepys sailed into Tangier in 1683, he wrote: ‘But Lord! How could ever anybody think this place fit to be kept at this charge [expense], that by its being overlooked by so many hills can never be secured against an enemy.’ [NRS v73 p. 16.]

† Mole.

* Unfortunately, he doesn’t seem to have got them back. However, Collins may have had the better bargain: his 1688 journal contains a superb coloured and annotated watercolour drawing signed by one Thomas Phillips, showing the signal flags flown from a flagship in battle. This is probably the same Thomas Phillips, an engineer and eminent London cartographer, who accompanied Pepys on his Tangier trip in 1683. [NRS v73, p. 107.]

† Isla de Tabarca.

* At this point Collins’ days and dates get a little muddled. He marks these entries with an X, perhaps to remind himself to check and correct them later.

† Iniquities.

‡ Meantime.

* Collins’ account of the battle is here augmented by the journal of one George Orton, who was aboard the *Plymouth* – probably as her purser, according to library notes that accompany the journal. [NMM: ROM/2; REG14/000588.2 U1515/06.]

* In Collins’ journal the ship is erroneously called *Rose of Algier.*

† Orton says Lübeck, not Hamburg.

‡ Orton.

* Lantern.

* Marseilles.

† White beans, or perhaps chickpeas.

* Although he did not publicly convert until after James came to the throne, Strickland came from a Catholic family, and his loyalties were therefore felt to be suspect. [Davies, *PN*, p. 270.]

† Zakynthos, in the Ionian.

‡ Izmir, in Turkey.

§ The news improved with travel – if this was the action of 1 April 1678, the Algerine was actually a forty-gun ship, the *Tiger*. It was a bloody engagement with many casualties. Herbert himself was wounded.

* Isola del Giglio.

† Eddies.

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3

Polishing the Young Duke

About 12 a clock last night 4 ships bore down upon us … keeping us company all night to windward till 6 a clock this morning, then made all the sail they could from us, which ships we supposed to be of Algiers by their good sailing.

Journal of Sir John Berry, in the Leopard, 28 September 1680

Charles II was not like his father. The old king was short, pious, proud, and obstinate to the point of self-destruction. His son stood a head taller, even before the execution, and witnessed the bloody fighting of the Civil War while still a child. He commanded troops in the field as a young man, and at the age of 21 was forced to flee into exile after defeat at the Battle of Worcester, his escape to France after six weeks on the run becoming the stuff of legend. Having seen first-hand where a belief in the divine right of kings could lead, he didn't grow up with the literal sense of God-given entitlement insisted upon by the old man.

Nevertheless, he quickly made up for it once the Restoration brought him to what he no doubt still regarded as his rightful place: the throne of England. It was 29 May 1660, his thirtieth birthday. In the Declaration of Breda, issued from exile, he promised leniency towards the failed republicans and tolerance not only of the wilder fringes of the Protestant faith, but of Catholicism too. Although his return to London did involve some rigorous housekeeping, including digging up Oliver Cromwell's decaying corpse in order to stick his head on a pole, and the execution of nine of the judges who had sentenced his father to death, the coronation of Charles II ushered in a period of relative stability and contentment, which was most welcome in the country after twenty years of turmoil.

Charles had spent his nine years of exile in France, the Spanish Netherlands, and the Dutch Republic. He developed an enthusiasm for yachting during his travels. It was not his only expensive hobby. He was married, in 1661, to a Portuguese princess: Catherine of Braganza. But that was a political liaison originally brokered during his father's reign – the princess' dowry included Bombay and Tangier as well as a huge pile of cash, in return for England's help in Portugal's struggle against Spain. Charles' conjugal interests famously lay elsewhere. He had more than a dozen mistresses during his lifetime, and while he and Catherine were unable to produce an heir, he seems to have fathered at least thirteen illegitimate children.

Henry Fitzroy was the seventh of them, the third child born to 23-year-old Barbara Villiers, who was the wife of the Earl of Castlemaine and a

noted court beauty from a Royalist family. Her role as Lady of the Bedchamber – the Queen's bedchamber, in theory – put her in daily contact with the monarch. As generous in spirit as he was with his *membrum virile*, Charles was quite unabashed by any moral misgivings, acknowledging all his offspring with honours and titles and putting the males to work in the family firm.

Young Henry Fitzroy was brought up to be a sailor. When he was 9 years old, he was made Baron Sudbury, Viscount Ipswich and Earl of Euston, to mark his engagement to the 5-year-old Isabella Bennet, daughter of a Royalist commander and a great-granddaughter of the Prince of Orange. When he was 12, he was made Duke of Grafton. When he was 16, in January 1680, he met Greenvile Collins on the deck of HMS *Leopard*.

The teenager was marked for a career in the navy as part of a policy of integrating young gentlemen into the armed services to form a loyal, Royalist officer class.[1] He had already spent some time at sea. The previous summer he had been sent out to join Narbrough's fleet in the Mediterranean, aboard the fifty-four-gun *Happy Return*. His arrival was noted by Henry Teonge, the chaplain of the *Royal Oak*,[2] whose first impression was of 'a brisk young man', who came to see how things were done in the navy. War games were laid on, a mock battle in the ships' boats that saw broadsides of 'muskets, blunderbusses, and petarreroes, and squibs and crackers, like hand granadoes'. The winner, to nobody's astonishment, was the teenage duke, who repaired aboard the *Bristol* to celebrate his victory. The ship was adorned 'with new waist cloths, and a pendant at every yard arm, which, as soon as the Duke came on board, were all let fly at once; and fired 13 guns of the lower tier. There they make merry.'

Keeping the privileged youngster happy on board could no doubt be a tiresome chore at times. Diarist and Deptford resident John Evelyn was friends with the family of Fitzroy's child bride, and described him as 'rudely bred'.[3] But at a time when promotion was virtually impossible without patronage, it paid to keep in with one's betters. Besides, as a son of the king, the guileless youth was already on the ultimate fast-track career path, and it behoved all who came into contact with him to remember that

within a very short time he might be the one giving the orders. When that time came, the better trained he was, the better commander he would be. Evelyn grudgingly conceded that the young man 'may emerge a plain, useful and robust officer, and were he polished, a tolerable person; for he is exceeding handsome, by far surpassing any of the King's other natural issue.' It fell to the officers of the *Leopard* to apply the polish.

The ship's bottom had been scrubbed and given its annual protective slathering of sulphur, pitch and tar against the worm at the Sheerness dockyard in Kent.[4] Collins was ferried down from London to join her on 14 January, having begun his new journal on the 7th:

> Received a warrant from the Right Honorable the Commissioners of His Majesty's Navy, to be Master of his Majesty's Ship Leopard, Captain Henry Killigrew Commander, and Appointed by His Majesty to cary his Grace the Duke of Grafton to Sea, this presant intend voyage for the Mediteranian Sea.[5]

In fact, Killigrew was not destined to command the *Leopard*, and had merely been overseeing the completion of her refit at Sheerness.[6] With the ship's guns, powder, ballast and cables back on board, his last job on the *Leopard* was to see her safely up the estuary to the anchorage at Hope Reach for provisioning. He then transferred his pennant to the *Foresight*, lying further upriver, where he would soon have his own VIP passenger to worry about. Although it seems to have come as a surprise to Collins, the change of command makes it clear that he, and not the captain, had been given responsibility for the young nobleman – and by the king himself.

It was an extraordinary compliment, and it wasn't just the king who was impressed with Collins. Promoted repeatedly by Narbrough during the previous commission, the admiral had paid him a final compliment of his own after their perfect landfall off Land's End, by promoting him one more time. At Spithead he gave Collins his first command: HMS *Lark*. She was only a little eighteen-gun sixth rate, and the task at hand was fairly

humdrum: collecting some soldiers from Jersey and transporting them back to Portsmouth. But he did the job efficiently, and when he was done Narbrough let him remain aboard as captain and take the little warship round to the Thames to pay off.

Having left the river three years before as the master of the *Charles* galley, Collins returned to Deptford in command of a ship of his own. As he left Narbrough's fleet in the Downs he expressed his gratitude in gunfire: 'Salluted ye Adm with 7 gunns & one for thanks'.

The teenage Duke of Grafton arrived on board along with the *Leopard*'s new commanding officer, Sir John Berry, on 28 January. Sir John was a 45-year-old senior captain from a Royalist north Devon family,[*] who had come up through the ranks to command the seventy-gun HMS *Resolution* with great distinction in battle against the Dutch. He was no doubt felt to be a safe pair of hands. Or safer than Sir William Poole, at any rate: the captain of the *Happy Return*, on Grafton's previous voyage, had a somewhat patchy disciplinary record, once spending an entirely unauthorised six months in Barbados, filling his frigate's hold with merchandise. He wasn't popular with the lower deck either: when he was ordered to transfer with his crew from one ship to another, most of the men refused to go, saying they 'would rather hang' than serve with him again.[7]

HMS *Leopard* was a two-decker, a fifty-four-gun fourth rate, built at Deptford by Jonas Shish and launched in 1659.[8] A sister ship to the *Newcastle*, she measured 109ft along her keel and nearly 34ft in the beam, and sailed with a wartime complement of 280 officers and men. Although not especially old, she had put in a long shift. This was her fourth trip to the Mediterranean. She had sailed across the Atlantic to Newfoundland, escorting huge merchant convoys laden with dried cod to their lucrative southern markets.[9] She had also ventured around the Cape to the East Indies, and taken her place in the line during four sea battles.

The ship was busy taking on supplies coming down on barges from the Deptford victualling yard, including bread, wood, 'pursers necessaryes', water, and no fewer than 154 tuns of beer.[10] The quantities required to victual a fully crewed fourth rate were enormous. A tun held 256 gallons. The preservative effects of hops and alcohol meant that beer remained drinkable in the ship's hold for far longer than stored water, and seamen were entitled to a gallon a day.[11]

'The wind at WNW,' Collins noted in his journal. 'His Grace the Duke of Grafton with Sir John Berry came on board and remained two hours, and then returned againe for London.'

As far as Berry was concerned the *Leopard* was showing her age. The irascible, battle-hardened Devon sea dog did not shy from telling his superiors what he thought of her refit. 'I never saw any ship so slightely and as I may trewly say carelessly set out,' he wrote to His Majesty's Commissioners for the Navy from Hope Reach. Her sails were old and worn, her awning 'all in raggs', and her longboat was a wreck: 'She is old her stern broaken the roule[†] on the bow is alsoe broake out, insoemuch as we cannot upon any occasion weigh or carrye out an anchor.' They needed a replacement boat, urgently: 'This being altogether unfitt to be carryed in such a voyage.'[12]

Berry's bad temper perhaps arose from the king's son being entitled to the best cabin. Prior to his brief visit to the ship with Berry, the teenage duke had been down to see the *Leopard* at Sheerness dockyard in order to approve the arrangements being made for his accommodation.[13] But he was not due to join her until she had left the Thames and lay at anchor in the Downs, ready to set off down-Channel as soon as the winds were favourable. Collins noted wryly that to make room for the royal party's baggage and the young man's private stores, 7 tuns of beer and thirty bags of bread had to be unloaded and put on a barge back to Deptford.

Sir John moved himself aboard in Hope Reach on 10 February, and they got under way from the Thames on 14 February, a Saturday, riding the ebb tide down the shallow, muddy estuary in typical winter weather. They paused just past the Nore as the chill easterly grew into a two-day gale,

before running along the Essex shore in the Swin and the King's Channel, and then striking out to seaward to clear the dangerous drying shoals of Sunk, Long Sand and Kentish Knock. Backing into the south-west and strengthening, the wind threatened to blow them across to Holland and beyond. It was too risky to beat against it, tack upon tack amongst the shoals in the darkness, in a ship whose windward abilities they had barely tried, and whose leeward tendencies were as yet unknown.

Berry and Collins were also discovering that she was somewhat over-ballasted, and too stiff by far – rather than giving to the seas with an easy roll, she would spring upright altogether too eagerly, putting significant strain on her masts. They could have run north and east into the relative safety of the southern North Sea, but the captain was having none of it. At two bells in the graveyard watch – one o'clock in the morning – they dropped anchor in 'strong winds and a great sea', in a depth of 25 fathoms, veering out cable to reduce the snatch and keep the tension as near horizontal as possible as big seas thumped into the ship's bows, and Collins estimated they were 9 leagues – 27 miles – east-north-east of North Foreland. Fearful of overtaxing the rigging, Berry ordered the yards and topmasts struck down – unrigged and fed through the shrouds to be lashed alongside the mainmasts, lowering the ship's centre of gravity. The gunner reported water flooding into the powder room, and 3ft deep in the hold.[14] They passed a long and anxious night. It was not the season to be at sea. The anchor held.

They finally made the Downs at noon on 21 February, lowering the best bower in 7 fathoms, with Deal Castle in transit with the windmill, a week after leaving the river. Berry was furious about the state of his ship: 'Should I enumerate all things amiss it would quite trie your patience as it has mine, to find all things in this disorderly posture,' he fumed to the Commissioners. 'The master attendant at Sheerness, a man unknone to me, is a great rascall.'[15]

As a succession of gales marched through from the west, they remained in the shelter of the white chalk cliffs and sent the ships' boats ashore to fill up casks with water. The Duke of Grafton arrived with his retinue, having

sailed down from London on the *Charlotte* yacht. Over on the *Foresight*, Captain Killigrew's VIP passenger also arrived from London: Sir Palmes Fairborne, a fire-breathing army officer posted to Tangier as governor and commander-in-chief.

The Commissioners had failed to find a new longboat for the *Leopard*, so Berry sent the old one ashore for repairs at Sawyer's, the local boatbuilder, grumbling: 'As long as I have known the King's service I never knew any ship sent out with old boats.'[16] He added that young Grafton had managed to lose the grapnel anchor and rope from his personal barge, so he would buy one locally and add it to the bill. Each time it came on to blow, Berry ordered the topmasts struck down.

After a month in the Downs the wind finally swung round to the east. Killigrew's forty-eight-gun *Foresight* was another Commonwealth-era, Deptford-built fourth rate, and the two king's ships weighed anchor on 21 March with eighteen merchant vessels under their protection, feeling their way down a fog-bound Channel and marking off the headlands as they left them to starboard: the low grey loom of Dungeness, the chalk cliffs of the Wight, the tide-swept Bill of Portland, and the jagged headland of the Start. They hove to occasionally to let the sluggards catch up, and anchored on the west side of Plymouth Sound, 'Maker Church bearing SSE', on 24 February. Collins, in his haste, had scribbled down the reciprocal of the bearing on his slate. He meant north-north-west.

It was a flying visit, or meant to be. They were there to top up with water, collect provisions and gather more ships into the convoy. Berry and his officers were painfully aware that at this time of year a seasonal succession of south-westerly gales could bottle them up in the Channel, sometimes for weeks, so when the light and variable southerly breezes strengthened during the night into a welcome fresh northerly that would sweep them past Ushant and waft them on their way across the Bay, they hoisted the signal to weigh. There was no response. 'Which the merchant ships did not answeare,' wrote Collins. 'Which made us to take in our lights againe, and rid still all night.'

The warships tried again at five in the morning, setting sail and making their way out of the Sound to await the sleepy merchantmen off Rame Head. It wasn't until nine o'clock that the convoy got properly under way. 'All our fleet being come out, which consisted of twenty three saile of merchant ships and two men of warr. At six at night the Lizard boare NE about 5 leagues off, a fresh gale all day and night at NE and ENE.'

It was a good passage south after such a slow start. This Mediterranean commission was to be somewhat different from the last one. Although neither Collins' journal nor his captain's make any mention of specific orders, with the king's son on board they were clearly expected to use the *Leopard* more as a teaching aid than as an instrument of war, and to steer clear of trouble rather than go looking for it.

As the weather warmed, the wind remained mainly in the north and east, and nine days after leaving the Lizard they cut close in under Cape St Vincent, at the south-western tip of Portugal, so the *Leopard*'s captain and master could give their young protégé the benefit of their experience. Perhaps to encourage the youngster with his own journal, Collins noted it all down:

> There is good anchoring on both sides of the Cape, on the east side of the cape is a faire sandy bay … Cape St Vincent is a steep cliffe about the height of South Foreland, within this cape in the country there is a high mountain called Mount Chago, and is seen farr of at sea both sides of the cape.

Berry sent Killigrew off in the *Foresight* with the Cádiz merchantmen, while the *Leopard* and the rest of the convoy continued south across the Straits.

It was eleven months since Collins had last been in Tangier, and the English colonial experiment was not going well. ‘We ffound the citty of Tangier besieged by the Moores, who have intrench themselves neer the citty in many places, especially round about Charles Fort, and have cut them off from having any releefe from the towne,’ Collins reported. The fort had six months’ worth of provisions, plenty of ammunition, and was defended by 150 English soldiers under one Captain Trelawny. The Moors were apparently tunnelling under the fort to set off a mine, and the English were aiming to countermine them. Next day the *Foresight* delivered Sir Palmes to take up his duties as governor and commander in chief. He would not see England again. The two frigates collected their miscellaneous remaining merchantmen and set sail for Málaga, Alicante and the eastern Mediterranean, pushed along by a helpful westerly breeze.

The English navy’s campaign against the Barbary corsairs continued. Narbrough had been replaced as Mediterranean commander-in-chief by Admiral Arthur Herbert, who was detested by Pepys but was nevertheless an effective and pragmatic operator. When he realised that his ships were having to go all the way to Livorno for naval stores and refits, he obtained permission to use Cádiz and Gibraltar instead, by the simple expedient of bribing their governors.[17]

The *Leopard*’s officers had no intention of joining in the fight against the Algerines. They were tasked with teaching the king’s son the rudiments of navigation and seamanship, and the king expected them to bring him back with his head still on. They cruised south of the Balearics, south of Sardinia, south of Sicily. Collins made a sketch of Pantelleria as it went by to starboard, more than 20 miles away – there was nothing else in sight – and drew some detailed views of Cape Passaro and its fort from quite close in. Merchant ships bade their farewells as they came within reach of their destinations, and by the time the English flotilla entered Greek waters on 22 April, the men-of-war had just five merchantmen to look after, all bound for Turkey.

It was perfect cruising weather, with steady breezes. Pristine whitecaps dressing the deep blue sea were mirrored by high wisps of cirrus in a deep

blue sky. The days and nights were clear. On 23 April, which he took care to note was St George's day – Grafton may have been born on the wrong side of the blanket, but his father was still head of the church – Collins got a good noon sight with his quadrant and calculated their latitude to be 36° 40'. He also demonstrated to his young charge how to determine the sun's amplitude, and use it find the magnetic variation. It was 6°W.

They stood in close to Cape Matapan and threaded their way northwards through the Greek islands, between Kythnos and Kea, Andros and Evvoia, north around Chios,[*] and into mainland Asia itself, where the city of Smyrna[†] sat at the head of a deep, right-angled inlet, 40 miles from the sea.

The frigates ghosted in as the bottom began to shelve, from 15 fathoms to 10, to 9, to 8. They dropped anchor a mile to seaward of Jacoma Point,[‡] leaving their merchant ships to sail on into the town. It was 2 May, twenty-three days out of Tangier. The weather was warm, with light airs off the land during the night and a regular 'fresh sea breeze called the Ambatty' taking over at ten in the morning. The Levant Company consul came aboard for dinner, later sending a janissary as a bodyguard and a dragoman as guide and interpreter to attend the teenage duke, whom he invited, along with Captain Berry, to his country retreat in the hills. Young Grafton, Collins noted, travelled incognito.

Smyrna was a lively and cosmopolitan port with a population of about eighty thousand, and direct trading links across Anatolia to Persia and the East. Its position at the top of a long, narrow inlet gave it protection from corsair raids, and the French and the English had been trading there with the merchants of the eastern Mediterranean for more than a hundred years, their taxes contributing significant quantities of cash to Ottoman coffers. The Street of the Franks ran along the waterfront, with its warehouses and the richly furnished villas of the European traders. Christians of various hues rubbed shoulders with Muslims and Jews, and along with its numerous mosques the town could offer several synagogues, and no fewer than six churches.[18]

It could also boast numerous Christian drinking dens, which were open day and night, and it might have been these which persuaded Captain Berry

that a quiet life, and the welfare of his crew, could best be ensured by mooring his ship several miles from the town. There was also the question of disease. True, the Thames was an open sewer for a population of half a million Londoners, but at least the water was changed twice a day. With negligible tidal flow so far inland, the air in Smyrna would have been pretty fetid in the height of summer, the water lapping at the quays resembling an unappetising soup. The town had suffered a severe outbreak of bubonic plague just a few years before.

The weather continued fair as the *Leopard* lay quietly at her anchors. Days passed in pleasant inactivity. Merchantmen came and went, from Holland, Alexandria and Constantinople, and the *Foresight* returned from escorting two ships to the Dardanelles. Collins, meanwhile, discovered the delights of the Turkish bath. He wrote:

> I went to visit a hot bath about 3 miles from Jacoma Castle which springeth out at the foot of a mountain, and is soe hot that I could not hold my hand in it. The roome is made so hot by the water that you fall into a sweat as soone as you enter. Their is a cold stream of water brought into the Cisterns where the hot water runneth in, so that you may make it hott according to your pleasure. The Turks and Greeks frequent this place much to bathe themselves, and do unanimously say that it is very holsome and good for pains and aches.

Sir John Berry also kept a journal, as he was required to do, although unlike that of Collins his was a clipped, pithy and strictly businesslike affair, with little notice taken of anything going on outside the ship. No Narbrough, he kept a log of routine repairs and maintenance, often remarked that the weather was ‘extraordinary hott’, and clearly made his own navigational notes, unless he used those of his lieutenant, as his observations of latitude and even wind direction were usually slightly different from those of the

Leopard's master. His vocabulary was distinctive too: 'a fresh gale' for Collins might be 'an easy gale' for his captain.

Collins had remembered his dog-eared copy of *Sandys Travels*. He dug it out again when the *Leopard* moved to the island of Chios. Gaining in confidence as an author – perhaps having to instruct young Grafton was helping him order his thoughts – he was no longer content with simply copying long screeds of Sandys' prose into his journal, as he had largely done at Naples, but paraphrased, abridged and corrected. The island was famous for its mastic trees, and Collins was invited one Thursday to accompany the duke and his companions on a trip ashore to see where they grew, in the hill country in the south of the island. On the way, feeling the summer heat, they called at a grand country house, 5 miles from the harbour. It was quite a spread, situated:

> … in a most pleasant cold place, where is a cold spring coming out of a rock under a large hall, which is all open at one end, loking out to the eastward upon most pleasant gardens, overlooking many miles of dellicate pleasant country well inhabited and full of gardens and houses, having also the prospect of the sea, seeing all ships and vessals that pass between Sio and the Asian shoare, looking many miles into Asia.

Chios also enjoyed a profusion of partridges. There were thousands of them, 'and are kept tame as hens,' Collins wrote. 'These patterages all day feed abroad and at night return home at the call of a whistle.' Young Grafton was taken with them, and bought several pairs to carry back to England.

Sandys' travelogue was noteworthy not just for its intelligent discernment, compendious curiosity and engaging descriptive powers, but also for its towering, wall-eyed bigotry. The many pages that the learned author

devoted to a history and description of Islam could only have come from deep, painstaking study, and he had seen for himself how Jews, Christians and Muslims rubbed along together in the eastern Mediterranean ports. And yet Sandys found Chios to be ‘governed by the Turks and defiled by their superstitions’, while Smyrna, that cosmopolitan crossroads with its churches, synagogues and mosques, he felt was ‘violated by the Mahometans, her beauty is turned to deformity, her knowledge to barbarism, her religion into impiety’.

The strength of the author’s prejudice made little impression on Collins. He was happy to put Sandys’ book to use in beefing up the cultural content of his journals, but while he had shown himself perfectly prepared to display the requisite level of anti-Catholic prejudice when it was called for, he did not endorse the Oxford classicist’s brand of religious intolerance.

He knew that Ottoman officials could be prickly. There were a few nervous moments on 20 May off Lesbos, where the *Leopard* and *Foresight* cleared for action and ran out their guns on encountering an enormous fleet of thirty-two Ottoman war galleys. The Turkish admiral demanded a salute. After some back and forth – summoned aboard the Turkish flagship to explain himself, Berry sent a message saying that the English king’s captains were forbidden to leave their ships – they eventually rendered the Turks a salute of eleven guns apiece. ‘The Pashan did not return our guns for thanks,’ Collins noted.

But on another occasion, when the English frigates found themselves sharing an anchorage with three warships from Tripoli, the semi-independent north African state on the fringes of Ottoman influence which Narbrough had persuaded to sign a treaty, salutes were duly offered and returned in the correct and courteous manner. The Tripolitan captains came aboard the *Leopard* for a visit, with ‘much friendship both sides’. The following evening, Berry, Killigrew and the young duke returned the compliment, Berry successfully negotiating the release of a captured Irish captain who was being held aboard the Tripolitan flagship.[19]

Whatever else they talked about, it wasn’t politics or religion, because when the English officers and their royal charge were rowed back to the

Leopard some time later, they were accompanied by the Tripolitan commander. He could not, however, be induced to come aboard for a nightcap. So the Englishmen clambered back down into the boat, and the party continued alongside. They ‘drank several health and fired gunns and parted’, wrote Collins, watching them with amusement from the quarterdeck. This entry in the journal ends with a long, wry and uncharacteristic squiggle from Collins’ quill. If Berry had a hangover next morning, he made no mention of it in his own journal.

On the island of Tenedos, just off the entrance to the Dardanelles, Collins and some of the other officers took themselves off for a picnic. It was a Sunday, and the picnic was a properly organised affair, with hired donkeys, a janissary and a dragoman. ‘We went over to the west side of the island, being about 5 miles over; in our way there we rid through many good pleasant viniards and corne fields,’ Collins noted. ‘At the west side of the island we saw the ruines of an old Greek church,’ which was destroyed, their dragoman explained, during the great battles of 1657, when fleets of Venetian and Ottoman galleys clashed for control of the straits and Tenedos changed hands several times. But now it was a tranquil spot, and still sacred to the island’s Greeks, who visited on Sundays and saints’ days. The spring that trickled out from beneath the stones had reputed healing powers: ‘excellent good for sore eyes’, Collins was told by their guide. Lunch was laid out on the grass in the shade of a spreading pine tree. ‘We dined after the Turkish manner on carpets on the ground, and drank more wine than water.’

In every sense, they were a long way from Deptford. Such encounters coloured Collins’ attitude to the places he visited and the people he met, and they made Sandys’ toxic distaste for the local religion seem out of place. Collins might also have remembered the stout seamanship and courageous resistance put up by the vastly outnumbered crew of the *Golden Marigold*, and felt that, as a naval man, respect was due. As a navigator, he would have understood the debt he owed to Islamic astronomers and mathematicians, not to mention the sixteenth-century Turkish cartographer Piri Reis, whose manuscript charts were still widely reproduced in the

Mediterranean, and which Collins would have encountered in the chandler's shops. He had simply spent too long ashore on this most relaxed of naval cruises to subscribe to Sandys' prejudices, and had enjoyed the hospitality of too many of the local people, whatever their beliefs.

When it came to the Ottoman regime, however, the Royal Navy warrant officer in Collins could be strongly disapproving. The shocking state of Chios harbour offended all his naval instincts when he saw the dilapidation of its stout sea wall and lighthouse, built by the Genoese in the previous century: 'The mole and lanterna are gone to decay for want of reparing, having not had any reparation since it hath bin in the hands of the Turks.' It clearly irked him. He mentioned it more than once.

It was hard to be cross for long, however. That entry appeared immediately after the account of his day trip ashore with the duke to see the mastic trees, and began with a most uncharacteristic calligraphic flourish. The initial 'I' takes up about five lines. If penmanship provides a clue to a writer's state of mind, then Collins at this point was having a pretty good time. Picnics under the trees, beautiful weather, and hobnobbing with royalty clearly agreed with him.

Between the *Leopard*'s arrival in the Aegean in the first week of May, and her departure three months later, the ship only moved between Smyrna, Tenedos and Chios, sometimes convoying small groups of merchant ships, sometimes not, but spending almost all of her time at anchor, except when Berry organised a cruise 'to keep our men in health'.[20] Young Grafton must have wondered if escort duty and anti-piracy patrols were always so relaxed.

Throughout the long, unhurried weeks of settled weather, cooled by scented breezes, with day trips ashore, fresh food, and palatable local wines, the ship's naval routine never faltered. The devil makes work for idle hands, and Berry made sure the hands were never idle for long – a fourth rate line-

of-battle ship did not clean, scrub and paint itself, while the resplendent gold leaf on its ornately carved stern was absolutely required to dazzle in the Mediterranean sunshine, and impress upon all foreigners the wealth and majesty of the English king. Collins no longer troubled to update his journal every day, however, and when he did, with the weather so unvaryingly perfect and nothing especially nautical, political or warlike to record, he often simply wrote, 'Fair wether with land breezes and Ambattyes'.

The devil also makes work for idle teenagers. No doubt young Henry Fitzroy was encouraged to improve his seamanship in the ship's boats as well as in his own barge, to familiarise himself with the cat's cradle of shrouds, stays, cringles, lifts and braces overhead, and learn the rudiments of knotting and splicing. He would also have spent time buried in his textbooks under the watchful eye of Collins, his navigation tutor, multiplying his departure by the secant of his latitude in order to arrive at his change of longitude,[21] all the while gazing furtively out of the stern windows at the girls under the olive trees.

The young duke made an obligatory visit, with Captain Killigrew of the *Foresight* and a party of gentlemen from both ships, to the ruins of Troy, or rather to Troas Alexandria, on the foreshore opposite their Tenedos anchorage. Collins had again consulted Sandys, along with another English author from his bookshelf, Peter Heylyn, whose *Cosmographie in Four Bookes* purported to contain *The Chorographie and Historie of the Whole World, and all the Principall Kingdomes, Provinces, Seas and Isles thereof.*[*] In these, Collins had discovered that the ruins the tourists all went to see were not those of Homer's Troy at all, but of a more recent settlement. 'Many ignorant people would have this to be the ruins of old Troy, which city was not seated on the seaside as this is,' he wrote, and went on to borrow a couple of pages' worth of extracts from both authors, paraphrasing and weaving the texts together, adding some thoughts of his own and copying down a quote from Ovid that Heylyn used:

> Corn fit for sithes now grows where Troy once stood
> and the soyle's fatted with the Phrygian blood[22]

He tried to keep his hand in with surveying work. His sketch of the anchorage at Tenedos is rudimentary, showing merely the soundings they made as they arrived, and very little else. The presence of a garrison of two thousand Turkish soldiers on the island probably had something to do with that, as they might not have taken kindly to a parcel of foreign sailors rowing around in front of their castle, plumbing the depths and taking bearings. From the ship, Collins also drew a coastal view of the ruins over on the mainland side, and made a copy of Sandys' map of the Hellespont and Old Troy.

His survey of Chios harbour was a lot more elaborate, complementing his detailed pilotage notes with accurately rendered frigates in the harbour, the sadly broken *lanterna* on the end of the ruined mole, and a perspective profile of the waterfront houses and fortifications. More impressive yet was his chart of the Gulf of Smyrna. This named many of the headlands and features, included more than two dozen individual soundings, and even showed the site of the bath house that he visited. While still only a sketch, it was a pretty reliable one – apart from its scale, which is way off. It was created on a carefully drawn pencil grid, to allow an accurate transposition of the angles, depths and distances that he scribbled down during his survey from the ships' boats, no doubt instructing Grafton in the finer points of coastal hydrography while he worked. Curiously, Collins chose to completely ignore an entire western limb of the bay. Unless he was in a great hurry, he could hardly have missed it. Perhaps, having discovered its protective shallows and prohibitive rocks, he wrote it off as neither useful nor relevant. This sketch chart was reproduced many years later by the engraver and cartographer Herman Moll[23] and the London publishers Mount & Page,[24] realigned to be more or less north-up, but otherwise faithfully copying the Collins survey, complete with missing limb and wayward mileage scale.

The 1680 journal differs in character from Collins' previous Mediterranean volume. The later cruise covered a lot less ground, not only because it was shorter in duration but because the *Leopard* spent so long in so few places, often doing nothing very much. Although Collins took his

opportunities to draw plenty of coastal views in 1680 – taken on the run as they sailed past harbours, islands and headlands, sometimes two or three to a page – he made necessarily fewer sketch charts and harbour surveys, even though he was clearly as concerned as ever with naval hydrography.

His attitude also underwent a change. As a navigator he had become harder to please. He was certainly more outspoken. On the southward passage from England, between Plymouth and Tangier, he found on 2 April that the ship had sailed 104 miles according to the log, while his sun sights and triangulations made it only 92 miles: 'Soe that the logg hath outrun the shipp 12 miles.' If the log were genuinely in error, it was obviously important to note the fact. There was no admission that his navigation might be at fault.

He had occasionally criticised his charts on the previous Mediterranean cruise, but only actually made a detailed note of their shortcomings three times in the three years, and then only in fairly mild terms. In the voyage of the *Leopard*, by contrast, his irritation at their inaccuracies took on a slightly exasperated air. On 17 April he reckoned to have measured the 'meridian distance' between the Balearic islet of Cabrera and their landfall off southern Sardinia at 81 leagues, 'which is more than our English charts make it'. Given the inbuilt weakness of the meridian distance concept – it was nothing more than a running tally of figures which were essentially determined by guesswork – this complaint can probably be disregarded. But on the morning of 22 April, cruising parallel to the south coast of Sicily, he espied the low-lying point of Cape Passaro, the island's southernmost tip, bearing east by south. 'Which according to the maps make our ship to be ashoare, at which time we were five leagues off from the shoare,' he snorted. Just a few days later, having reached Greek waters and calculated the distance between Cape Passaro and Cape Madona to be 96 leagues, he wrote: 'Note that this Cape lyeth about 25 miles more southerly than our English charts make it.'*

He put the entry on its own line for extra emphasis. He knew his journal would be inspected by the Lords of the Admiralty as a matter of course, and almost certainly by the king himself – it had happened before, and with the

king's son on board the *Leopard* it was bound to happen again. An expression of dissatisfaction with the charts, with its implication that he could do a better job himself, would not go amiss in the corridors of power.

Certainly, Collins was older and more experienced – by now he was 37 – and he can be forgiven for being more inclined to trust in his own abilities than in those of an unknown hydrographer from the last age. He had also had the role of royal navigation instructor thrust upon him. He needed to seem infallible to his young charge, or pretty nearly, and be seen to be so. If he disagreed with the chart, there were three possible explanations: either the chart was wrong, or he was wrong, or both. Collins was hardly going to impugn his own authority in front of young Grafton, so whenever a discrepancy arose, it was always going to be the chart at fault. He would thus have taught his student one of the central tenets of navigation – that little could be relied upon as certain in this arcane alchemy of art and science, which was as dependent on interpretation and experience as on hard data. It was one of the most important principles he could impress on the youngster.

After three weeks at anchor off Chios town, the *Leopard* sailed back to Smyrna, taking a rather circuitous route. The wind had been steadily in the north for weeks, and attempting to tack the ship out through the north-eastern channel, where the airstream was funnelled between the high ground of Chios and the island of Oinousses just a mile offshore, was out of the question. So they made a cruise of it, heading south around the island, weighing on Tuesday, 13 July, in a fresh, buffeting breeze. There seems to have been no pressing reason to move the ship, except to keep the crew busy, because once they arrived back in Smyrna, they remained there another three weeks. The short voyage seems primarily to have been for the benefit of the young duke, to allow him to put some of his navigation theory into practice – a sort of seventeenth-century Yachtmaster exam.

Somewhere in the middle of the Aegean, between Chios and Andros, sat Kaloyeroi, a tall volcanic pinnacle that jutted out of the sea, steep-to, unlit, and barely a hundred yards across, with a reputation as a ships' graveyard and with a monastery perched on its summit.[25] They had sailed past it on their way into the Aegean, early one morning back in May, possibly even seeing it in the distance, silhouetted against the rising sun, just as the monks were intoning their morning prayers. To find it again would make a challenging navigational exercise.

There were numerous printed Mediterranean charts available to Collins, from English, Dutch and Italian publishers, not to mention any manuscript charts he might have acquired from local chandlers during this or his previous Mediterranean commission. Publishers borrowed and stole from each other, further muddying the waters. Collins mentioned having an 'English Waggoner',[26] but that doesn't narrow it down very much: Lucas Janszoon Waghenaer's name had become a generic term for any sea atlas. Whichever charts they had on the *Leopard*, the precise location of Kaloyeroi was a matter of some conjecture. None of the chart-makers seemed to really know.

Most charts that did show the island tended to agree that it was at roughly the same latitude as Chios town, and closer to Euboea than to Chios itself. This presumed position, on maps and charts by Ortelius, Levanto, Van Keulen and Seller, put it too far north and west in relation to Chios. Mercator put it too far south and west. A Cantelli da Vignola map got the latitude about right, but it was still too far west.

Many charts didn't show Kaloyeroi at all. Puzzlingly, maps by Blaeu, Van der Aa, and Janssonius a Waesberghe showed no island but placed the Latin word 'Hodie' in its approximate position, as if some ancient mariner sailing past in the night had been spooked by the monks' ghostly plainchant, and scratched an *aide memoir* onto his portolan that had been faithfully copied ever since.

The *Leopard* sailed close inshore as she rounded the southern tip of Chios, cutting inside the small island of Venetico in the lively breeze. 'Then we sprung our luff and stood away to the westwards alongst the south end

of Xio, which lyeth NWbN and SEbE about 5 leagues.' 'Sprung our luff' is quite jaunty language for Collins. It means hardening up the set of the sails so as to track as close to the wind as possible. In the eighty thousand words of his four journals, he only uses the expression three times, and the other two examples both occur on the same day, when he was attempting to convey the intensity and drama of the battle with the *Golden Marigold*. It is perhaps also the sort of expression that one might use, with an inward smile, to catch the mood of an excited 16-year-old on the quarterdeck, taking charge of a man-of-war for the first time.

The ship followed the high Chios shoreline for about 3 leagues by Collins' reckoning, before bearing off, out into the Aegean, steering between west by north and north-west by north as evening fell.

Their course was shaped to lead them straight to the presumed position of the island, about 35 miles away. There was still a fresh northerly wind, but by reducing sail in the usual way during the hours of darkness, keeping their speed down to about 3 knots, and taking due account of the ship's leeway, they would hope to see their island a safe distance off at first light.

And so they did. 'At 4 in the morning we saw the little high island called Colloyre, that lyeth between Xio and St Andrea,' Collins wrote. However, it wasn't where they expected it to be, in the offing just under their bowsprit. It was behind them, over the port quarter, 'bearing SE about 3 leagues'. To assuage the disappointment of the young duke, who would naturally have been hoping for a better landfall, Collins declared that a current had set them too far north, and made due note of it. In fact, they were roughly where they had intended to be, and at roughly the right time, according to the information they had. It was the charts that were wrong, not their navigation.

As the sky brightened, they held their course for an hour to gain some sea room, and at five o'clock tacked the ship and headed for the channel between off-lying Ipsara* and the north-west tip of Chios, and then eastwards once more into Smyrna bay.

They dropped anchor in their usual spot, and there they stayed as July wore on into August. After the customary delays while waiting for the

merchant ships to finish filling their holds with the wealth of Asia – silks, currants, nutmeg, pepper, indigo – the *Foresight* and the *Leopard* got under way on the fourth of the month, with five English merchantmen to convoy. One was for Livorno, three were headed for London, and one was continuing on to Holland. They threaded their way southward through the islands in light airs, taking the inside passage past Kythira and calling in at Methoni, where they saw two ships moored under the guns of the castle and which Collins, from a distance, judged to be a good anchorage – although he might have changed his mind if they had gone in and taken some soundings.

South around Sicily, close in, they frightened a local fishing fleet into hauling up their boats, 'being afraid that [we] were Turks', and remarked upon the numerous watchtowers along the pirate-infested shoreline. They refilled the butts with water at Sciacca, where Berry had to go ashore and browbeat the local governor about his exorbitant prices. Sailing past Mazara next morning, near the western tip of Sicily, Collins thought it looked 'a most delicate towne, beautiful and regular', adding that 'all the south side of Sicillia is a very pleasant country, and well inhabited and fortified'. Sir John and the duke went ashore on the little island of Levanzo to stretch their legs, finding nothing to shoot but rabbits and quails, while Collins made a sketch from the deck of the anchored *Leopard*, and recorded a strong south-going current.

Bound for Livorno, they cruised slowly northwards in light, variable breezes. Collins made a note of the dangerous Formiche rocks to the west of Montecristo, 'being very low, and show no bigger than a good longboate'. At Pianosa Sir John and young Grafton went for another stroll to explore the ruins of an old castle. The locals ran and hid. 'They found the footings of men, cattle, sheep, goats, doggs and arsses, but could not find any of them, being as soposed drove away into some place fearing that we were Turks,' Collins wrote. 'In the night we saw fires on the island.'

The *Leopard* and the *Foresight* anchored off Livorno with their merchant ships on 7 September. They were immediately told the bad news from Tangier – the besieged English soldiers in Charles Fort had sallied

forth, blown up the fort and made a brave dash for the town, but out of a force of 150, only thirty men had reached the city gates. Of more immediate concern was the intelligence that six Algerian ships had recently raided Livorno and carried off two Levant Company merchantmen.

While the two English frigates and their convoy took on water and provisions, Collins did what he would have wanted to do eighteen months before in the *Newcastle*, but didn't have time: he made a detailed survey of Livorno's roadstead and harbour, perhaps with young Grafton's help in the boat, drawing up his fair copy on a pencilled grid that took up a whole page and included numerous soundings. He also wrote detailed pilotage notes warning of the Mallora sandbank, and made a useful drawing of the inner harbour from the anchorage, showing the relative positions of the lighthouse and the piled rocks of the *moletta* breakwater.

Collins heard that the 'Duke of Florence' was in town. This was Cosimo III de Medici, the well-travelled and powerful Duke of Tuscany, who had been to England and met Charles II, Robert Hooke, Newton and Boyle. Samuel Pepys had found him 'a very jolly and good comely man', perhaps not realising, or not minding, that his regime was noted for its vicious persecution of Jews.[27] Hearing that Grafton was aboard a warship in the anchorage, the Italian conveyed a message offering free pratique should he wish to come ashore and grant the local drapers and tailors the benefit of the royal purse. Still a novice in the art of diplomacy, the young duke sent his regrets, explaining that they were nearly ready to sail.

News arrived that Grafton had been made a Knight of the Garter. Collins made a loyal acknowledgement of the fact in his journal, just as, back in May, he had fulsomely noted the king's birthday: 'His Majs Charles the 2d birthday and happy restoration to his kingdoms after 12 years exile, being now 50 years old, haveing reigned 32 years. God grant him many a happy and properous year more to reign.' He had never bothered to do this before, but if any journal was likely to be perused by the king, it was surely this one.

Now with just four merchant ships under their wing, the English frigates headed westwards again on 15 September, passing within sight of Cape

Corsica and Point Revellata. The wind was kind – a ‘fine gale’ from the east – but it dropped off to a calm as they approached Menorca, and then came howling out of the west-north-west. They tacked and ran south between Menorca and Mallorca, only for the wind to change again and strengthen, in ‘thick, hasey wether’. Shepherding their sluglike merchantmen, it took them six days to weather Mallorca and its southern sentinel, Cabrera, and on 27 September they were still south-east of Formentera, battling against stiff westerlies, tack upon tack, day and night. Fortunately, visibility improved. Between eight in the morning and six at night, according to Collins’ notes of the distance and bearing to the eastern end of the island, they made good less than 7 miles.

Wearying and tedious as it undoubtedly was, in a war zone situations can change quickly.

Two bells in the middle watch saw the full moon at its height, the ships on the starboard tack, and the wind firmly in the west, ‘a fresh gale’, when the *Leopard*’s lookout hailed from the masthead. ‘Four saile of ships right ahead bearing down upon us,’ Collins wrote. Signal lights flew up ordering the merchantmen to close up, while Captains Berry and Killigrew gave the orders to clear their ships for action. ‘All things ready for fight, the fouer ships came within half a mile of us and brought too.’ The English ships were alert, and the intruders can have only seen them at the same time, or slightly later, since bearing down with the breeze a point or two free before suddenly hauling their wind beyond gunnery range was no sort of battle plan. But once they recovered it was clear that they knew their business, ‘keeping to windward some times standing to the northward and sometimes to the southard’. A tacking duel developed and went on all night, the windward ships conceding nothing and the English warships, keeping their flock together, making what they could of their silhouetted adversaries as the moon went down over Spain.

By daybreak, Berry and Killigrew could see what they were up against – four Algerian ships of war, well-manned, well-handled and firmly in possession of the weather gage. Outnumbered they may have been – and four against two could prove very awkward with a convoy to protect – but

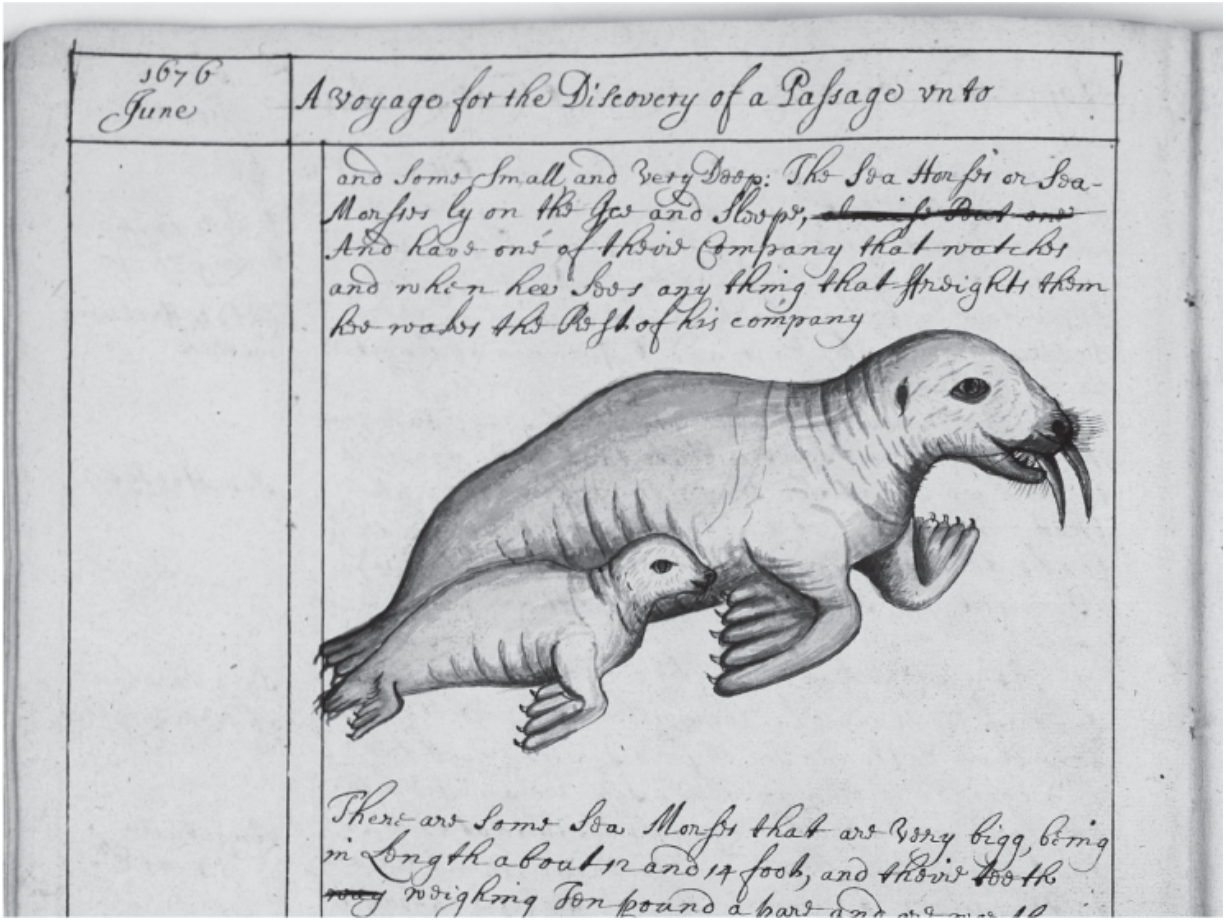
both English captains, most of the warrant officers, including Collins, and many of the hands were veterans of major fleet actions in the North Sea against the Dutch, involving hundreds of ships, thousands of men, and decks awash with blood. Berry's *Resolution* alone had suffered upwards of one hundred casualties at Solebay. As the English captains made a steely appraisal of their adversaries at dawn on 18 September, neither man was under any illusions, and neither could have been described as shy.

Squinting into the rising sun, the Algerians could also see what fate had offered them: four fat merchantmen, it was true, which with a bit of luck could be snapped up and whisked away to Algiers on this favourable breeze, 150 miles south-east by east – maybe. But English merchantmen had guns too,[28] and these ones were protected by two aggressively handled fourth rates, each with both rows of gunports open, their leeward heel allowing them to present their full broadsides, ready to hit hard if the Algerines tacked within range, and to rake them cruelly should they contemplate a daring dash downwind to swarm aboard.

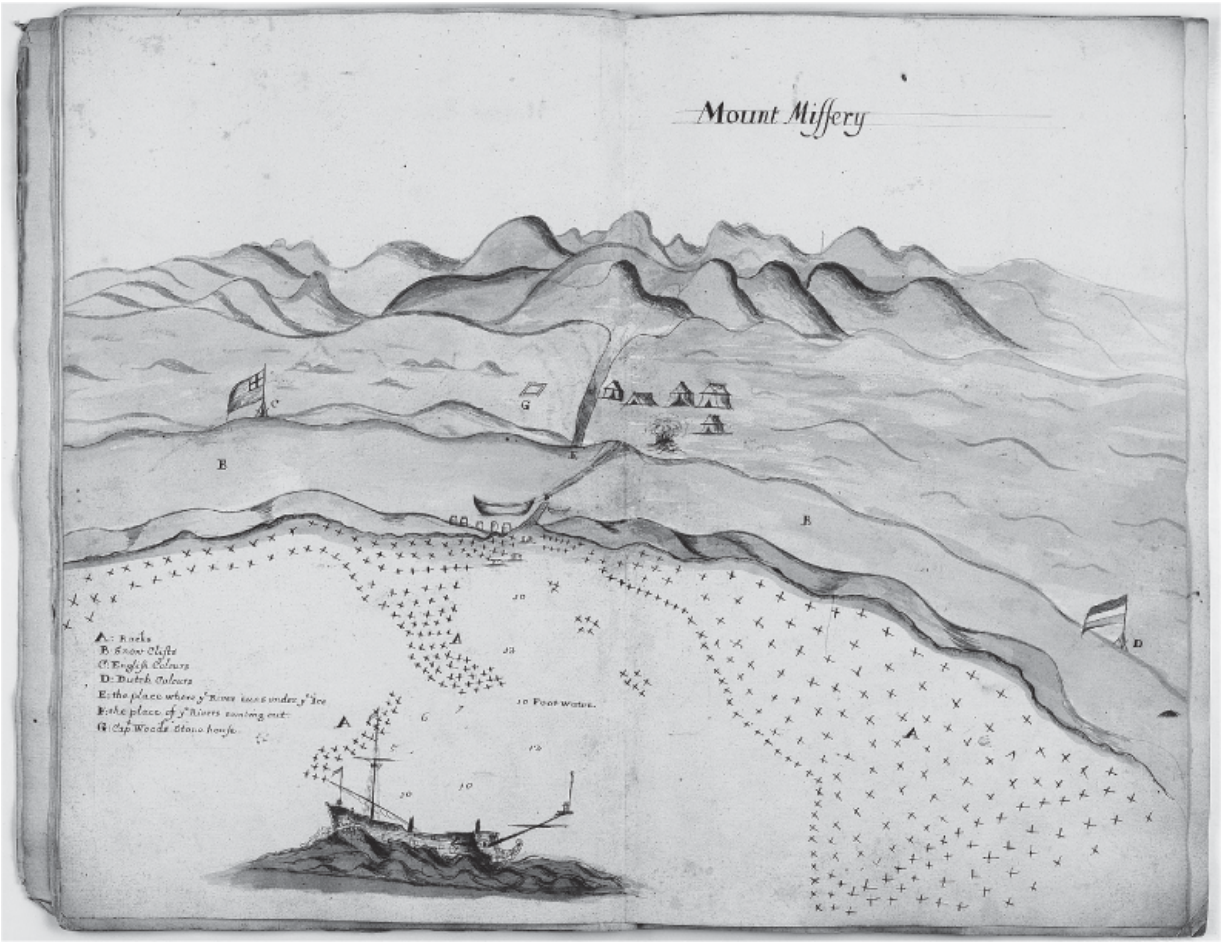
Their commander didn't take long to make up his mind. 'Finding that we were too strong for them,' Collins wrote, the Algerians stood away to the south. Relief, perhaps, among the men-of-war, and jubilation aboard the merchantmen, warmed by the strengthening sun as they watched the hostile sails diminish towards the African shore.

It was young Grafton's birthday. He was 17.

Perhaps the first ever survey by Greenvile Collins, undertaken in June 1676 during the *Speedwell*'s voyage north – Lerwick harbour in Shetland. (Arader Galleries)

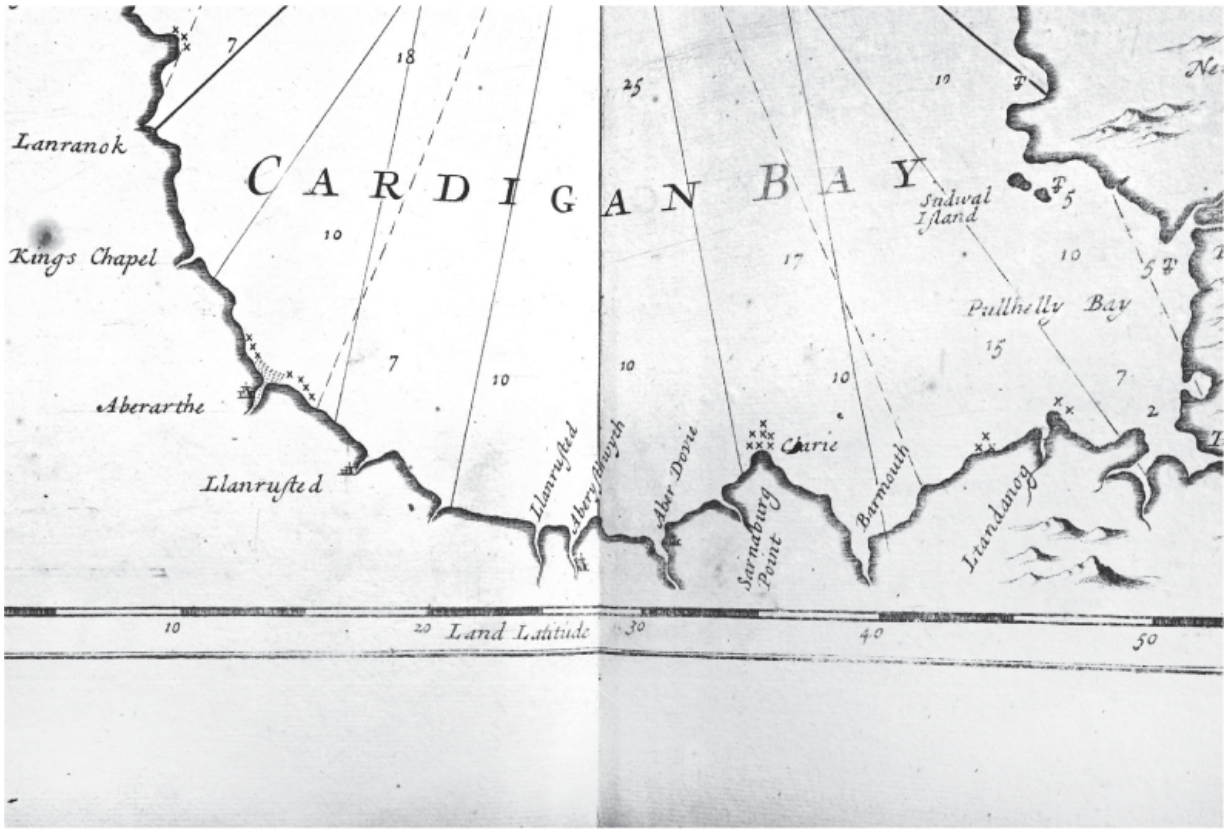


A walrus and her calf observed on the ice – Collins' journal entry for 27 June 1676. (Arader Galleries)

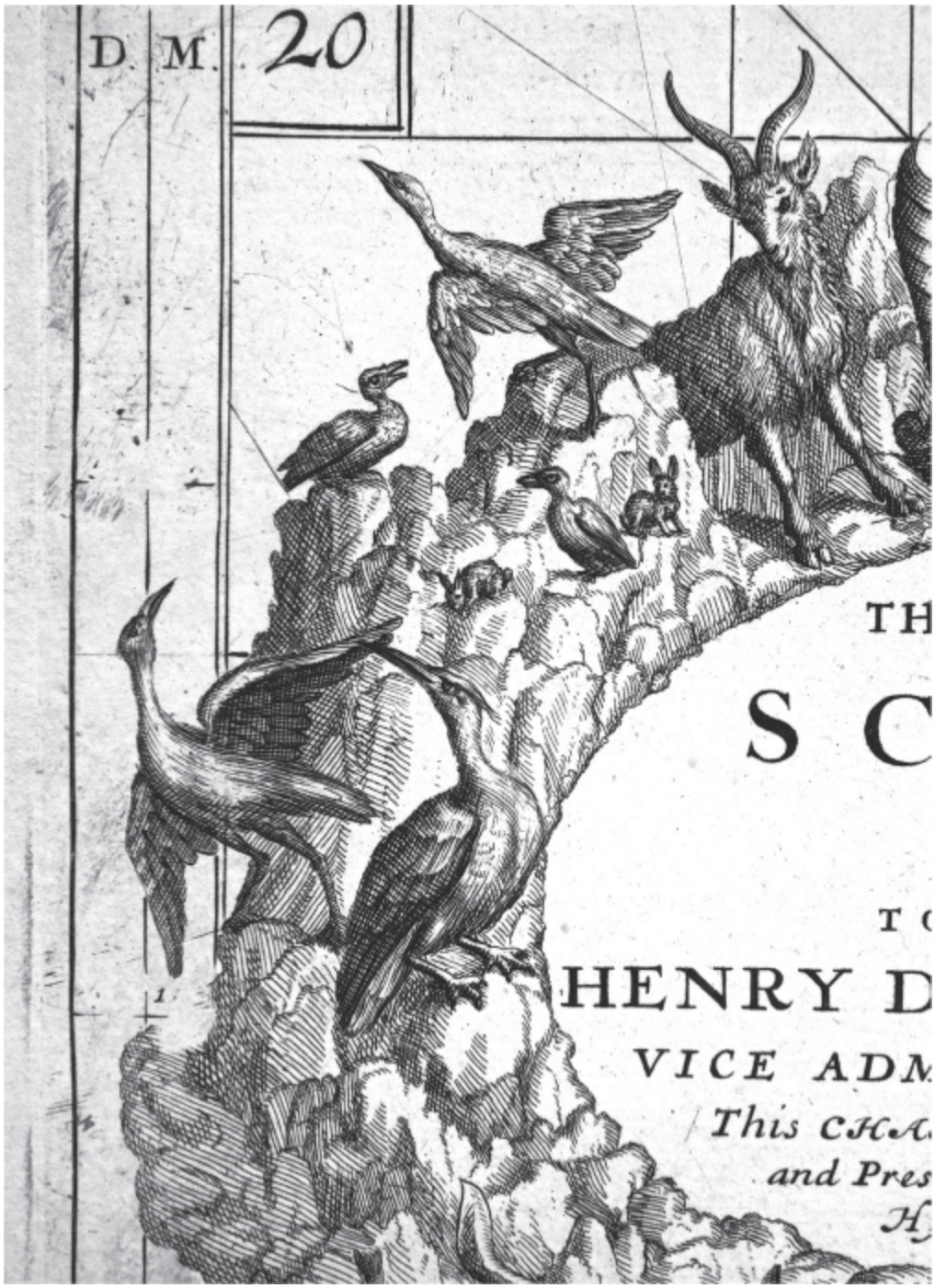


Wrecked in the fog on the coast of Novaya Zemlya, the *Speedwell* broke up swiftly, leaving her crew stranded on an ice-bound shore. (Arader Galleries)

Samuel Pepys, the diarist and naval administrator, was an important figure in Collins' early career. Engraving based on the 1666 portrait by John Hayls. (Llyfrgell Genedlaethol Cymru – The National Library of Wales)



A detail from Chart 26, one of several whose earliest impressions bore the inexplicable ‘sea latitude’ and ‘land latitude’ annotations. (Guildhall Library, City of London)



The Scilly chart reveals its secret, or perhaps deepens its mystery – the partly erased ‘11’ in the Minutes column of an early impression. (Guildhall Library, City of London)

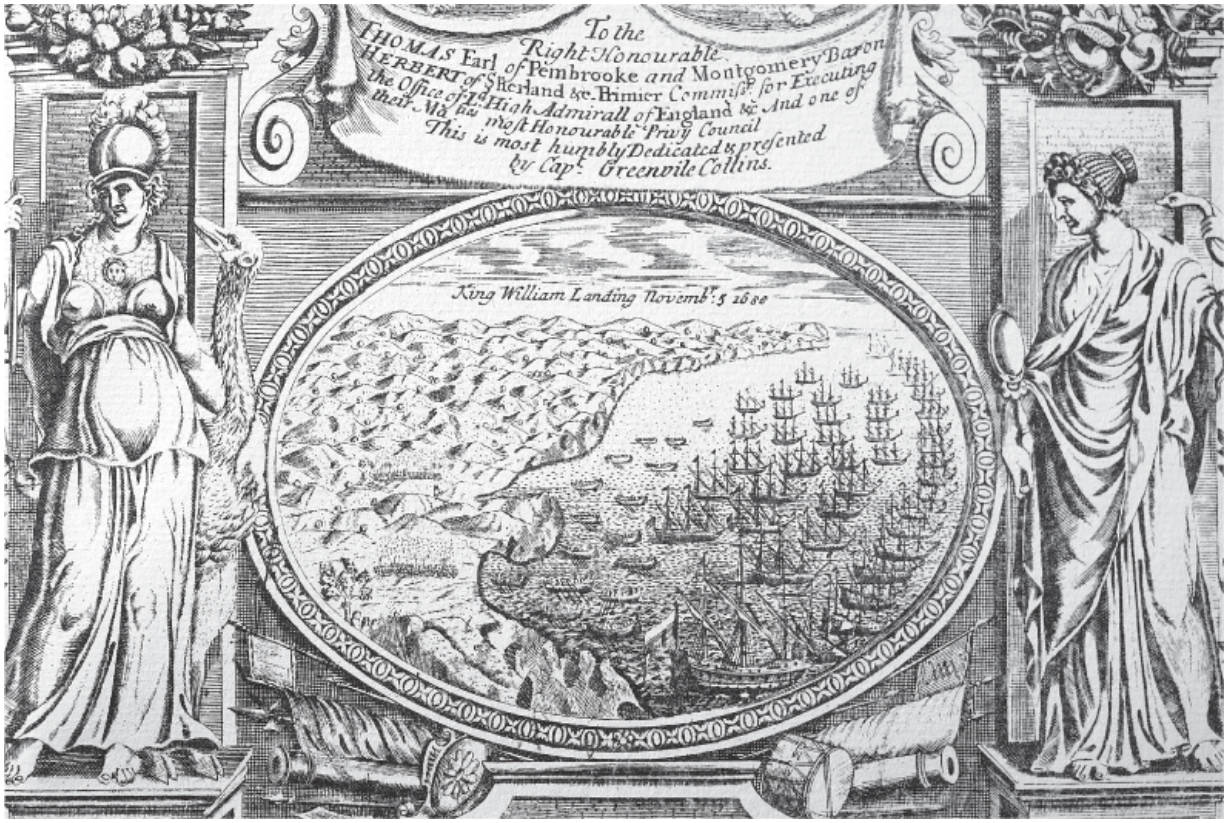
London by Hollar – a city of tides, mud, steps and slipways. Viewed from Milford Stairs, where HMS *Wellington* is now moored. (Rogers Fund, 1918, Metropolitan Museum of Art)

Brave in battle, poor at politics, and Britain’s last Catholic king – James II in a contemporary engraving based on a portrait by Kneller. (Llyfrgell Genedlaethol Cymru – The National Library of Wales)

The *Mary* yacht takes centre stage on Chart 32, which commemorated William III's landing in Ireland at Carrickfergus in 1690. Collins brought him there from Chester. (Guildhall Library, City of London)

William III is commemorated on the Brixham quayside just a few yards from where he landed on 5 November 1688. Collins became his yacht captain. (Author photo)

A busy seventeenth-century printing press, in a contemporary Dutch engraving. Collins found adapting to his new profession, as a publisher and editor, an uphill struggle. (Rijksmuseum)



Wrong Herbert – Admiral Arthur Herbert's invasion fleet illustrated on the Torbay chart cartouche, beneath a dedication to Admiral Thomas Herbert. (Author)

They closed the Spanish coast a few days later, calling in at Alicante, and Collins came within a whisker of losing the ship on Isla de Tabarca* when a sudden, fearsome squall split first the foresail and then the mainsail, just as she was drawing level with the island. Only a fortuitous shift in wind direction averted disaster. 'Had not the wind came aft we could not have wethered it, but must perforst to anchor, where I doe verily believe that anchor and cables could not hould in so much wind,' wrote Collins.

Their arrival in Málaga coincided with an actual disaster: a catastrophic earthquake had destroyed much of the town just a few days before. It lasted half a minute, Collins learned, and 'damnified about 3000 houses and some churches', although the cathedral had escaped damage. Eighty people were killed, and plague had broken out.

The *Leopard* and *Foresight* sailed for England from Cádiz at the end of October, with twenty-eight merchant ships under their protection. The wind,

as ever, was contrary, and so began a voyage filled with storms, split sails and perpetual headwinds. Berry led the convoy far out into the Atlantic to gain enough sea room to weather Cape Finisterre. Merchant ships lost contact during the hours of darkness, never to be seen by their consorts again. Twenty-four days out, with the convoy some 150 miles off the Portuguese coast and by Collins' reckoning still barely at the latitude of the Burlings, one of the merchant ships, the *Elisabeth*, sprang a leak and sent a desperate plea for men to help man the pumps. Berry sent eight across. Then the *America* lost her rudder and the *Leopard* took her in tow, sending her carpenter to help with repairs.

With this fraught and seemingly endless drama playing itself out in his journal, green water sweeping along the deck and constant drips from the caulked seams overhead, Collins had not forgotten his obligations to the young duke. While the principles of seamanship are of a robustly practical nature, and the basics of coastal navigation involve a modicum of mental application, ocean navigation will tend to stretch a young man's mind. A few pages from the end of the journal are two full-page, hand-drawn charts, both showing the laborious, meandering track of the *Leopard* as a dotted line from Cádiz towards the English Channel. One is a plane chart, with parallel lines of latitude and meridians of longitude overlaid in a graticule of equal squares, while the other is drawn on an approximation of the Mercator projection, its meridians parallel and its degrees of latitude expanding gradually as they progress northwards. The two charts are labelled in large, didactic lettering: 'Plaine' and 'Mercator', and offer the clearest insight in the journal of Collins' role as navigation instructor, sitting at the table with the young Duke in the *Leopard*'s great cabin.

There is nothing resembling these pages in any of Collins' other surviving journals. If he wanted to keep a visual record of the ship's track day by day to augment his navigation notes, he would have done so in the customary manner by pricking his printed chart with the point of his dividers. These manuscript charts were not navigation aids, but teaching aids, the work of master and pupil – Collins demonstrating the principles of the Mercator projection on his chart, albeit rather sketchily, while the young

nobleman plotted the ship's track on his own plane chart. It is true that Grafton's coastal outlines are rather fanciful, and his plot of the ship's track has gone somewhat awry, but Collins kept both, and clearly valued the young man's contribution to the journal.*

The trying voyage continued. The weather was appalling. Labouring in head seas, the *Leopard*'s hawse and upperworks were damaged as a powerful wave broke over her bows, and with grim satisfaction Berry ordered the despised longboat to be pulled apart so that its timbers could be used as reinforcement. The mainsail's boltrope parted, the wind shredding the sail before it could be hauled down. Berry's normally matter-of-fact journal speaks of 'terrible' and 'violent' gusts.[29] On 20 November he noted that only fifteen of their twenty-two ships were still in sight, before recalling that his over-ballasted ship was 'working so extreamly last night we were in danger of rowling our mainmast by the board'.[30] He ordered up preventer stays to reinforce the hard-pressed shrouds.

Collins' descriptions of the horrible weather verge upon the Biblical: 'A strong gale from the SW to the NW, and then the wind tooke us short at NW and NE with showers of raine and haile, calmes and sudden gusts and cold wether.' They had no sooner reached soundings in the approaches to the English Channel when another gale blew in, and with the Lizard bearing north-north-west just 4 leagues off they were forced south. They beat their way again up towards Falmouth, only for the wind to shift once more. They altered course for Plymouth, as the remaining merchant ships parted company and set off up-Channel. 'At 12 at night the wind tooke us short at ENE, we tryed† till daylight, having a storme,' wrote Collins wearily. As they made towards Falmouth again, the wind lessened and steadied in the north-east: 'We set our foresaile and made saile for to get into Falmouth, but … the step of our foremast was found to give way, being old and rotten. We tooke in our foretopsaile and set the maine topsail & spritsail and eased our foremast what we could.'

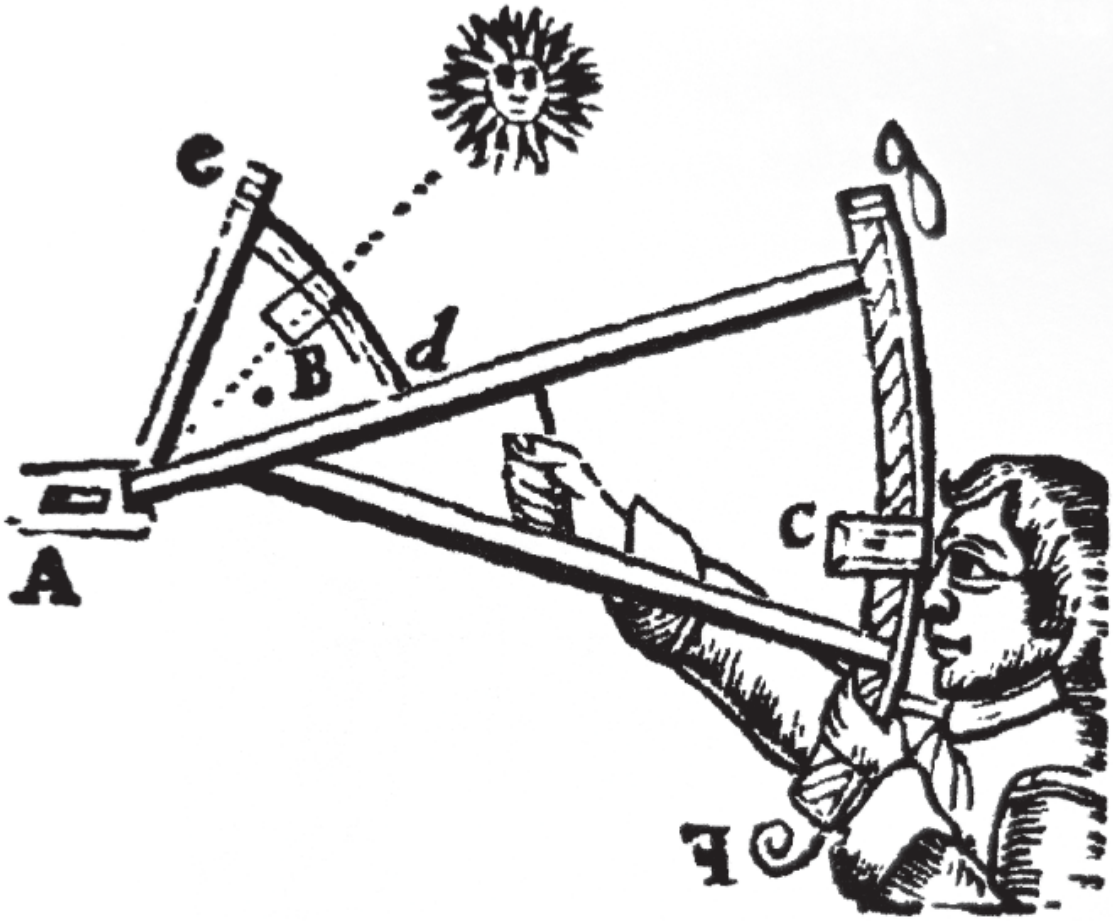
Protected by the high surrounding hills of Falmouth's natural harbour, they were finally able to drop anchor off the town in Carrick Roads. Berry's forebodings about the state of his ship had been borne out. She was barely

seaworthy. Her entire forward mast assembly – foremast, foretopmast and foretopgallant mast, 3 tons of solid spruce that towered more than 100ft above deck level – had broken loose from its rotten oak step far below the waterline, and had it toppled could have demolished the forepart of the ship.

Berry wrote to the Commissioners: ‘We may all thank God we are here now alive.’ As for the necessary repairs, ‘I must be forst to lay out my own money, the King having no credit here.’[31] Next day, while Grafton and Berry were entertained to dinner by the mayor and aldermen of Penryn, Collins supervised the hands in shifting stores and powder barrels from the forward hold so that the carpenter could get at the foremast step. ‘We found the step old and rotten and crackt. The carpenter brought a piece of good 4 inch planck on the afterside and boulted it fast to the step, and shoared the mast.’ As a repair it wouldn’t last long, but it might get them home.

The *Leopard* finally dropped anchor in the Downs on 23 December, at ten o’clock on a grey, drizzly morning, fifty-six days out of Cádiz. Her officers and men still had plenty of work to do before they could sign off and go home, but Grafton could hardly wait to get away, travelling post to London the same day, and later sending the *Cleveland* yacht downriver to pick up his baggage.

It’s impossible to say whether Collins noticed the deception on the young duke’s beautifully drawn plane chart. But even if he did, it probably wouldn’t have lessened its value as a souvenir of his time as schoolmaster to the king’s son. At Charles’ court, even a teenager could wield power and influence. Grafton and his old instructor would meet again.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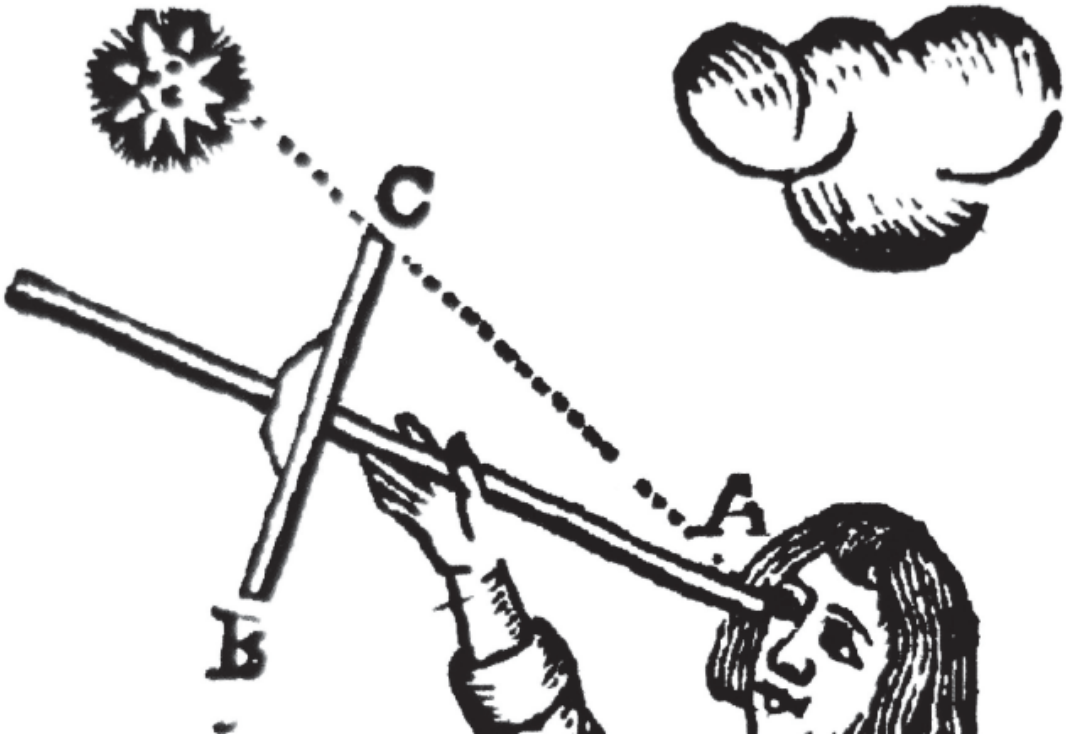
C
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B

Cross-staff and Davis quadrant, as seen in John Seller's *Practical Navigation* textbook first published in 1669. (Author)

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* Berry was from Knowstone, just 20 miles from the parish church where Collins was baptised, so it is possible that the families knew each other. [https://archive.org/details/b22007313/page/68/mode/2up?view=theater]

† Roller.

* Also spelt by Collins as Xio or Sio.

† Izmir.

‡ Yenikale.

* Heylyn's *Cosmographie* also seems to borrow fairly liberally from Sandys.

* Collins' calculations of distances between these headlands were not accurate. Since he was using 'meridian distance' as the basis for his complaint these errors were inevitable, and maybe the log, which he implied (on 2 April) was over-reading by about 13 per cent, was actually not that bad. The latitude discrepancies are more difficult to check, because we don't know which charts Collins was using. He mentions an 'English Waggoner' (journal entry 28 August), which might have been the London map-maker John Seller's *Atlas Maritimus* (1671). On these charts the longitudinal distances are pretty good, better than those of Collins. Their latitudes are not good, but their error is to the north, not to the south as Collins complains.

* Nisos Psara.

* Referred to by Collins as both St Pauls Island and Cunny Island.

* See Appendix C.

† Lay to.

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4

Hydrographer to the King

The King in discourse with me at Newmarket about Collins' present business of surveying our sea-coasts does say that we never had our coasts so well laid down, and that therefore he designs to encourage Collins in the work; the King declaring how ignorant our forefathers have ever been therein.

Naval minutes of Samuel Pepys, 1682

A glimpse of the serpentine promontory of Worms Head through the scud and spray of a blustery Bristol Channel might be a cause of inward satisfaction to a seventeenth-century ship's master – hidden carefully, of course, beneath a veneer of professional calm. A confirmed sighting of a recognised landmark, a safe distance off and roughly where you expected it to be, is the best possible landfall. Worms Head bearing north-east, 5 leagues off – 15 miles – would make a perfect fix from which to plan the tricky inbound passage up the Channel and into the Severn Estuary, between those useful islands Steep Holm and Flat Holm, there to pick up a pilot for the River Avon, and in on the flood tide to the bustling port city of Bristol itself.

On the other hand, a glimpse of the serpentine promontory of Worms Head through the scud and spray of a blustery Bristol Channel might be a cause of inward consternation to a seventeenth-century ship's master – hidden carefully beneath a veneer of professional calm, as he steeled himself to tell the captain that they had evidently missed Land's End and were not, in fact, proceeding up the English Channel towards the Downs, North Foreland and London. Regrettably, sire, that distant headland is not Start Point, but South Wales.

But a confirmed sighting of an unmistakable landmark was still an invaluable aid to the navigator. The ship's master might not be where he wanted to be, but at least he now knew where he was. And Greenvile Collins was with him in spirit. On page twelve of his magisterial *Great Britain*'s *Coasting Pilot*, he wrote: 'If any shippe that may be bound up the English Channel, and shall happen to come up the Severn, not having a wind to get into the English Channel, then I advise them to go for Milford.'

With a salt-stained pragmatism born of years of experience, Collins focused on the task in hand. Well off course, contrary wind, land under your lee – what should be done? And the truth of the matter would have been acknowledged by all of his readers. After weeks at sea in indifferent weather, with only occasional, sketchy opportunities to measure the sun's altitude with his backstaff, a navigator might have only the vaguest idea of his latitude. But with a position confirmed by a conspicuous landmark, the

next task would be to ensure the safety of the ship, and Collins' advice here was more than just a brotherly hand on the shoulder of any navigator whose confidence might be a bit bruised. He recommended Milford Haven as 'certainly the best harbour in the 3 kingdoms', with its deep water, sheltering hills, and an entrance free from off-lying dangers – an ideal place to anchor, take stock, and wait for a favourable wind. Milford meant safety. Groping around uncertainly in the waters off Land's End could, and often did, mean shipwreck and death, for it is an area fraught with danger.

The British coastline in the seventeenth century had more opportunities than most to show its teeth. This was not just because of its rocks and shoals, its strong tides and stronger winds, and its tendency to hide itself behind fogs and squalls, but because it was also home to a stubborn, seagoing people whose insistence on venturing out in rough-hewn, unhandy vessels armed with primitive navigation instruments, no safety equipment and only the vaguest idea of what the weather might have in store provided it with a plentiful supply of potential victims. The coast was a busy place. The nation had a voracious appetite for fish,* so every port worthy of the name had its fishing boats trawling the local waters, and some had seasonal fleets that ventured far and wide in search of North Sea herring or Newfoundland cod. Seaborne trade was burgeoning, whether financed by the city-backed companies of 'merchant adventurers' making their fortunes in Africa, the Mediterranean, the Caribbean and the Far East, or in private ships that plied back and forth to France, Spain, Italy and the Netherlands. As the roads were mostly terrible, especially in winter, packet boats provided the quickest and most reliable means of communication between London and many of the kingdom's farther-flung counties. Much domestic commerce was also waterborne, such as the Newcastle trade that fed the capital's limitless appetite for coal.

So Britain's inshore waters were alive with vessels of all shapes and sizes, arriving, departing and travelling along the coast, negotiating topographical features with names like Doom Bar and Hell's Mouth, and manned by hard-bitten crews who knew that if the wind shifted at the wrong moment, or a sail split, or the fog descended, they could be entrusting themselves to those last resorts of the sailor, immortalised in the names of innumerable harbourside pubs: the anchor, and hope.

Then there was the Royal Navy. The shipbuilding programme begun by Charles I was hugely expanded under Oliver Cromwell's Commonwealth – it was amazing how beheading one's king tended to provoke one's enemies – and continued under Charles II. A motley flotilla of thirty-three ships in 1625 had grown into an impressive fleet of 144 vessels of all classes by 1653, and although their overall number did not alter appreciably over the next twenty years or so, the ships themselves got bigger. The navy of 1677 had fewer of the diminutive fifth and sixth rates than it had in 1660, for example, but fifteen third rates had become twenty-two, with another twenty under construction. And while the older third rates typically mounted sixty guns with a crew of 360, the new-builds were all seventy-gun ships with a hundred more men on board.[1] It was costing a fortune.

One man very much concerned with the expense was Samuel Pepys. The Secretary to the Admiralty had been instrumental in getting this latest fleet expansion under way. The '30 great ships' programme signed off in 1677 included one new first rate and nine seconds as well as those twenty third rates, and Pepys himself had insisted on the standardisation of their design, masts, spars and armament.[2] He had been working on improving efficiencies since his appointment as Clerk of the Acts[*] in 1660, which put him in administrative control of the Royal Dockyards.[†] He strove with some success to streamline procurement and limit corruption, seemingly with a genuine belief that the gifts and favours that showered down upon him personally didn't really count. As his influence increased, he spread his net more widely, overhauling the victualling system, establishing a mathematical school at Christ's Hospital for the training of future navigators, and, at the instigation of the Duke of York,[3] introducing a

lieutenant's examination to improve the quality of seagoing officers. He also brought some order to the navy's method of rating ships, deciding that it should reflect the number of guns carried, for this determined the size of its crew, and therefore its victualling requirements, and its wage bill.

A first-rate ship of the line cost more than £50,000 to build, fit out and make ready for sea,[4] at a time when the Wren and Hooke churches shooting up in the city to replace those destroyed in the Great Fire were coming in at between £5,000 and £10,000 each.[5] It was a sobering sum to lose in an unlucky encounter with a misplaced sandbank. Pepys was well aware of the inadequacies of contemporary nautical charts, whether English or Dutch – and those few English charts were invariably copied from Dutch originals. Naval officers had complained about them for years. In his journal of 1673, the recently knighted captain of the *St Michael*, Sir John Narbrough, took some trouble to fix the position of the Dogger Bank in the North Sea, and came to the conclusion that his charts were out by more than 20 miles: 'I would advise all draught-makers to correct this error and lay it down true,' he wrote. Later in the year he found that:

> the White Water bank lieth more northerly by 9 or 10 leagues than it is laid down in our English draughts or plats, and that the Dutch draughts or charts are truer than the English … but the depths of water that is laid down in all draughts and charts are false … I never could find the depth of water to agree with the depth laid down in the charts in any place in this North Sea.[6]

Narbrough was not alone. Frustrated by his fleet's failure during the first Battle of Schoonvelde to flush the outnumbered Dutch from their protective shoals, Admiral Sir Edward Spragge wrote on 25 May 1673, from the 100-gun *Royal Prince*:

> The banks of Flanders are laid between two and 2½ leagues at the least farther off than they are set down on the cards, we being now

> with the body of the fleet anchored in 15 fathom water, Ostend S of us and not above 5 leagues off, the land being plain to be seen all along. In times of peace we ought to employ some able men to the finding the truth and danger of these banks.[7]

Reading journals like these and hearing similar complaints from other naval officers reinforced Pepys in his belief that something ought to be done. It was a strategic necessity:'The French knew the way into our principal ports, and particularly up the River of Thames as high as Gravesend, in the time of Edward the 5th or 6th, when they burnt it,' he wrote in his notebook. 'Consequently, no strangers to our sands and soundings so long ago; and why should we think they are grown so since, their commerce with us having ever since increased?'[8]

The memory of the much more recent Medway raid in 1667 was still fresh in all official minds, when a Dutch force sailed into the Thames Estuary, bombarded the fort at Sheerness, ventured all the way up the winding, tidal river to the royal dockyard at Chatham – a distance of more than 10 miles inland – and burnt thirteen ships of the line. Adding an insult that was even more stinging than the considerable injury they had already inflicted, they then cut out and made off with the first-rate *Royal Charles*.

It was ridiculous, and an affront to Pepys' patriotism, that English warships navigating in English waters should be using Dutch charts.

In December 1680, Greenvile Collins came back from his year-long voyage to the Mediterranean with Captain Berry and the young Duke of Grafton aboard the creaking fourth-rate HMS *Leopard*. Grafton had jumped ship as soon as the first fluke of the anchor dug into the sands of the Downs, but the rest of the crew would have to wait, because the Admiralty soon found the *Leopard* another job to do. It wasn't until 2 May that they were finally allowed upriver to Deptford Dockyard to pay off.

But Collins managed to secure some leave during March, and with the ship anchored at Gravesend, he took a boat up to his home in Westminster. He had married shortly before the voyage began, in September 1679, at St Luke's church in Chelsea,[9] and he and his 22-year-old wife Elinor – Collins was 36 on his wedding day – were able to spend just a few months together before the *Leopard* sailed. In August 1680, with her husband in the eastern Mediterranean, she had a daughter, Isabella, but the baby only lived for a few weeks.[10] Collins never met her. So once at home, conveniently, he claimed to have fallen 'very sick' and stayed with Elinor for a month.[*]

Service life and family life were largely incompatible. Collins had lately spent far more time at sea than ashore. Less than three months after his return from the Arctic, he was aboard the *Charles* galley, preparing for a Mediterranean commission that ended up lasting three years. The marriage took place during six weeks of shore leave, after which he set off on the *Leopard* cruise. It was relentless.

At least his career seemed to be on an upward trajectory. He was in demand as a respected and reliable master. None of his recent postings had exactly been routine. And now he had married a nice girl, who needed looking after. She, presumably, was not best pleased at the prospect of losing her husband again to some foreign voyage of indeterminate length. He had to find a way of staying closer to home, and he had an idea that would allow him to do so – a great survey of the British coast.

He had already prepared the ground. The success of his two recent voyages gave him some leverage – Narbrough had clearly been impressed with him, promoting him repeatedly. The Duke of Grafton had also presumably enjoyed his cruise, at least until the tortuous voyage home, and in his Mediterranean journals Collins had worked hard to present himself as a capable surveyor and draftsman, while the sketches and surveys in the Arctic journal still stood him in good stead, not least because of the arduous circumstances in which they had been drawn.

Of more than 180 pages of the 1676–79 journal, thirty-six are enlivened by his sketch charts and coastal views. They start with his detailed plan of Falmouth on the voyage out aboard the *Charles* galley. This was probably

copied earlier from a fellow officer's journal, perhaps during their interminable period of waiting in the Thames and the Downs, since with its numerous soundings and detailed shoreline, it contains more information than Collins could possibly have acquired during the few hours of dim January daylight that were available to him on the one full day they had there. Nevertheless, he stood at a critical distance from his less rigorous colleague's work, sketching in some amendments to the outline of the Pendennis promontory by eye.

Then, on arrival in Tangier, almost the first thing he committed to his journal was a hasty survey of the anchorage. This was certainly his work – with but a meagre pair of soundings taken from the ship as it swung around its cable, a 'G' to indicate good holding ground, and a rumour of 'a sunck rock' positioned a mile or so off the old town, it would hardly have been worth copying from another master's notes. But it indicated his intention not to waste any opportunity, and with the benefit of a little hindsight it can perhaps be said to mark the start of Collins' determined effort to establish himself in the eyes of his superiors as a scientific sea officer, on a mission to accumulate and disseminate knowledge for the navy's greater good.

Much more elaborate efforts were to follow, such as his plan of Gibraltar, with numerous soundings in the anchorage, and the equally detailed surveys he made at Alicante, Altea, Málaga and elsewhere. His fascination with Mount Vesuvius resulted in several drawings that indulged his interest as a travel writer, but Greenvile Collins the hydrographer backed them up with an excellent, full-page sketch chart of Naples Bay, showing the whole coastline from Lago Patria to Punta Campanella, and including the islands of Procida, Ischia and Capri.

A submerged rock he discovered 13ft below the surface on his second survey off Cartagena – he marked it '1678', having first plied the lead there the previous year – can be seen in exactly the same position on current charts, at a depth of 12.5ft. Even his harbour views, with their domed churches, prominent castles and stone-built harbour walls, were not merely decorative, but were there to help any ship's master new to the place get his bearings on the approach, much as photographs do in modern pilot books.

The long 1676–79 journal is filled with these useful and practical aids for future navigators, and the number of sketches and surveys in his shorter 1680 volume is proportionately even higher.

He also had an ally, or at least a useful contact, in Samuel Pepys. We don't know how or when they first met. Patronage was key to advancement in the Stuart navy, and while it is possible that the diarist knew the Collins family of old – Pepys aficionados have indicated that the way he referred to him as 'young Collins' suggests as much[11] – it was as Charles II's Secretary to the Admiralty that Pepys became an early champion of Collins' career. As an investor in the Arctic expedition as well as a senior naval administrator, Pepys had a say in the manning of ships. While it is true that his suggestion of Captain Golden as master of the *Speedwell* got short shrift from the king, he may well have then supported Captain Wood's wish to appoint 'young Collins' to the post. And after their return from the Arctic, it was Pepys who introduced Collins to the king – perhaps also taking the opportunity to bask in some reflected glory for having supported his appointment in the first place.

Collins had also helped engineer his own advancement. With its charts, drawings, observations and navigation notes, the work he had put into his Arctic journal paid off in his promotion to the *Charles* galley, personally endorsed by the king, and now, four years later, he had two noteworthy Mediterranean commissions under his belt, earning the preferment of Sir John Narbrough, and the trust and gratitude of the king himself. With this spotless record and a demonstrable talent for his trade, Collins was in an unusually strong position to choose his next job.

By contrast, Pepys' fortunes rose and fell during this period. He had been closely associated with James, Duke of York, since the Restoration, when Charles made his brother Lord High Admiral and Pepys was appointed to the Navy Board. Pepys was no Catholic sympathiser, but he did remain loyal to his old master even after the Exclusion Crisis removed James from office, and Pepys was forced to resign as Secretary of the Navy during the Popish Plot scare, serving time in the Tower under suspicion of collusion with the French. The charges were dropped, believed fabricated,

but his star had fallen, and it would be a while before it was back in the ascendant. He did not return to the Admiralty until 1684.

But by now Collins was sufficiently established to gain an audience with the king in his own right, and during his leave of absence from the *Leopard* while 'very sick' in the spring of 1681, he persuaded Charles to commission him to undertake the great survey. Captain Collins, according to the monarch's warrant, was to 'make a survey of the sea coasts of the kingdom by measuring all the sea coast with a chain and taking all the bearings of the headlands with their exact latitudes, the true plots of all the harbours, rivers, roads, bays, creeks, islands, soundings and the setting and flowing of tides, which will tend much to the security of navigation'. Here the king's enthusiasm slightly overwhelmed his understanding, if he imagined Collins measuring the entire coastline of his realm with a chain, rather than using the chain to set out a baseline for triangulation. But no matter. The king required all of his officers, civil and military, to allow Collins 'to pass by sea or land without hindrance or molestation in and about the execution of that service and afford him and such others as he shall make use of all reasonable aid'.[12] Subsequent warrants in ensuing years widened this cast of characters to include 'all noblemen, privy councillors, judges, the universities, magistrates and gentry and particularly the officers of the Navy and traders and navigators to encourage the said undertaking by their subscriptions and to give the said Capt Collins all assistance to enable him to finish his said work'.[13]

Collins was not Pepys' first choice for the task. The naval secretary felt himself to be something of an expert on maps and charts, and since arriving at the Navy Office in 1660 had accumulated an impressive collection of both manuscript and printed examples, including several expensive atlases and globes from France, Italy and especially Holland. He frequented the shops and studios of the London map-makers, and tasked his nephew Jackson with bringing maps back from his European travels. He had kept hold of Captain John Wood's Arctic journal, with its polar map, and one of Sir John Narbrough's journals from the 1670s had also taken up residence in his library. He acquired this material in the course of his work – it was

important that he knew where places were – but he also enjoyed the maps as artworks, and hung them on the wall.[14]

He had been banging on about the need for better charts of British waters for some time, and his was not a lone voice. Map making was having a moment. The Tudor and early Stuart maps of Christopher Saxton, John Norden and John Speed set high standards for their successors – Collins would later remark to Pepys that 'our sea-coasts were better laid down by Speed than they are in our Waggoner'[15] – while John Ogilby's famous road atlas of England and Wales, consisting of one hundred folio-sized strip maps, was published in 1675. When the diarist John Evelyn inspected the king's private library in Whitehall – the monarch was away, and he bribed the cleaning lady to gain entrance – he was awestruck by Hans Holbein's *Noli me Tangere*, disappointed to find among the thousand-plus volumes 'few of any greate importance, or which I had not perused before', and slightly disquieted to discover 'three or four' beautifully illuminated Catholic prayer books. But he enjoyed the 'divers curious clocks, watches and pendules of exquisite work', 'pieces relating to the Navy', and an 'aboundance of mapps and sea-charts'.[16]

The king's brother James, Duke of York, was also keen on cartography. He commissioned Captain Christopher Gunman to undertake various inshore surveys in the 1670s, including one of the Thames Estuary.[17] John Adair, a Scottish surveyor, was engaged in 1683 by the Privy Council of Scotland to produce an atlas that would include both land and coastal surveys. The Privy Council reported directly to the king's representative north of the border – the Duke of York – so James' involvement in the project is clear. It is possible that Collins and Adair later collaborated.

For Pepys, familiar as he was with the London trade in printed and manuscript maps and charts, Greenvile Collins was just one possible candidate to undertake the survey. The pre-eminent London map-maker at the time was John Seller, who published an impressive portfolio of maps, charts, atlases and pilots from his wharf-side studio at Hermitage Stairs in Wapping, on the north bank of the river just downstream of the Tower. Seller also manufactured instruments, published navigation textbooks and

almanacs, and was primarily a purveyor of surveys rather than a surveyor himself. His works included charts of Far Eastern and North American waters as well as those of northern Europe and the Mediterranean, and his output suggests an excellent set of contacts in the surveying world. He was, allegedly, not above printing charts from second-hand copper plates acquired from Dutch printers, complete with mistakes and Dutch spellings,[18] but he did offer a serious alternative for English navigators in a trade that had been dominated by the Dutch since Waghenaer in the previous century. In the 1670s he was allowed to describe himself as Hydrographer to the King.

Another candidate for the coastal survey was John Adams, one of the most accomplished surveyors and map-makers of the age. Based in London and a lawyer by trade, he produced an enormous map of England and Wales in 1677, 6ft square and printed on twelve sheets, with mileages shown between towns and a table of their latitudes and longitudes. By 1681 he was in the process of improving and updating it, with the backing of members of the Royal Society including Robert Hooke, Isaac Newton and John Flamsteed.[19] He set up a 12-mile baseline in the Somerset Levels, acquired a huge quadrant of 50in radius and began negotiations with the Admiralty for a fleet of boats and crews to enable him to survey the inshore waters as well. There was initially some talk of setting up Adams, the Admiralty's man, with Collins, whose warrant came from the king, to work together. It didn't come to anything.[20]

Collins had influential friends. Pepys' attitude to the survey was always tempered by a note of scepticism, but he remained broadly supportive. He would have preferred the project to proceed under the official oversight of Trinity House, which looked after lights, buoys and pilotage in English waters and, among other responsibilities, issued certificates of competence to naval masters such as Collins.[21] But when Collins applied to Trinity House for a warrant, which would have allowed him to style himself as hydrographer to the House, Pepys counselled caution: if the House were to do so it would 'bring upon them, by writing himself their officer in that capacity, an accountableness for all his mistakes and their consequences'.

The wrangle was ironed out by an influential old shipmate. The Master of Trinity House by this time was none other than the 20-year-old Duke of Grafton, a committed supporter of Collins and his survey, and, it turned out, a diplomatic committee man. Collins, he proposed, should not describe himself as Hydrographer to Trinity House on anything that was published until it had been submitted for approval to the House – an elegant compromise that Pepys duly entered into the minutes.[22]

Ultimately it was Collins' kingly connections that proved crucial. His Arctic journal had so impressed the monarch that he personally appointed Collins to be master of the *Charles* galley. His cool conduct aboard the *James* in battle with the Algerine frigate *Golden Marigold* saw him promoted to the *Newcastle* and then to the *Plymouth*, as Narbrough showed his faith in him. The greatest trust was shown by Charles himself, in the appointment of Collins as tutor to his teenage son, the Duke of Grafton. As Pepys wrote in a note to himself once the survey was under way:

> Remember how often I have pressed the Trinity House (before Collins went ever about it) to the taking into their own hands the sounding of our coasts, and particularly at the time when Adams, Collins, and Seller were all pretending* to go about it, applying themselves severally to us for our countenance to them therein to the King. But we neglecting, it fell into Collins's hands by virtue of his having served the King and being thereby known to him.[23]

Charles II and his brother James, Duke of York, were active, vigorous men with many interests, cartography being just one. What they enjoyed most – apart from horse racing and siring illegitimate children with the wives and daughters of their courtiers – was yachting, which was something they had discovered during their exile. It was a new thing in England. John Evelyn wrote, shortly after the Restoration:

> I sailed this morning with his Majestie on one of his yaachts (or pleasure boates) vessels newly known amongst us … and very excellent sailing vessels. It was on a wager between his other new pleasure boate, built fregate-like, and one of the Duke of Yorks, the wager 100 pounds.’[24]

The race was down the Thames from Greenwich to Gravesend and back. The duke won the outward leg and the king the return.

To mark his return to the English throne in 1660, the City of Amsterdam presented Charles with two yachts, broad-beamed and Dutch-built, with the shallow draught and lee-boards typical of their type. The king and his brother lost no time in soliciting English shipbuilders to come up with their own take on the pleasure-boat concept, and Evelyn’s ‘frigate-like’ aptly describes these home-grown craft, with the elegant sheer and high stern of a miniature warship, although they used a simple rig that could be easily handled by a small crew – generally a single mast, a loose-footed gaff mainsail, a square topsail and one or two staysails tacked to a long bowsprit. They were small, typically just 50–55ft along the keel and 18–19ft in the beam, but lavishly decorated with the carved wood and gilding that adorned the warships of the day, and usually armed with small cannon. By the 1680s, sailing had become a fashionable pursuit among the gentry, many of whom had commissioned their own yachts, and the Royal Navy had a small flotilla of them based at the royal dockyard in Deptford, just downriver from London. Some of these were fitted out for the king’s and the duke’s personal use, complete with paintings and marble, damask curtains and pewter chamber pots, and in these the royal brothers engaged in yacht races and entertained their myriad mistresses. There was one called *Kitchen*, where chefs slaved over hot stoves to produce waterborne banquets on summer picnic cruises. But most were more workaday vessels, employed all year round as packet boats and on harbour service duties.[25]

For his survey, Greenvile Collins was entrusted in the summer of 1681 with the yacht *Merlin*. She was built in 1666 by Jonas Shish at Rotherhithe, 53ft along her keel by 19ft 6in in the beam, drawing 7ft 4in aft. She had a

peacetime crew complement of twenty, which included two captain's servants, a cook, mate, boatswain, bosun's mate, quartermaster, gunner, carpenter, surgeon, midshipman and eight seamen.[26] As her commanding officer, Collins enjoyed a palatial cabin across the full width of the stern, with a sweep of windows facing aft, which was considerably bigger than the cupboard-sized compartment he would have been entitled to as the master of any man-of-war.

The survey would of necessity be a seasonal activity, and Collins wasted no time in getting it under way. Having paid off from the *Leopard* in May, he was appointed to the yacht in June and moved aboard with his commission as the *Merlin*'s post captain on 8 July.[27] On 2 August he was already down in the West Country, writing a hasty note to London from Plymouth Sound, addressed to the Admiralty commissioners in Mark Lane:

> I came into this port this day sevennight and am now under saile bound away to the westward, since my being here I have taken an exact survey of this place, and some others about it, and for the setting & flowing of tydes, I have taken the advices of the skilfullest seamen and ffishermen of these parts, I am now surveying the coast between this place and Ffalmouth and soe to Silly, in my way I intend to take some observations about the Eddy Stone, ffrom Ffalmouth I shall write your Honors againe, I shall loose noe time, but use all dilligence possible in this survey.[28]

No logbooks survive from Collins' time on the great survey, and this is the first of the handful of letters in the archives that help to mark its progress. Perhaps taking advantage of an easterly breeze as he left the Thames, he had elected to start his work on England's south coast in the west, knowing that once the prevailing south-westerlies set in, which they were sure to do as the season wore on, they would blow him home again for the winter.

Just seven days after arriving in Plymouth he was on his way again. It seems impossible that he could have completed a useable survey of this

expansive natural harbour in such a short space of time, but he had by now had plenty of practice, and he did work fast. He would have visited the place before, and taken the opportunity to note down the important soundings and bearings. And having consulted Plymouth's 'skilfullest seamen and ffishermen' about the tides, he could also reassure himself – or at least hope – that he hadn't missed anything important with the lead line.*

But he also had to obtain an accurate shape for the coastline, and quite how he did this is a matter of conjecture. He was certainly well equipped. Among the instruments he acquired for the survey was an enormous, 5ft radius, brass quadrant for measuring latitude, that cost £60. There was also a smaller quadrant (£12) and a theodolite (£12 10*s*), along with measuring chains and measuring wheels, an azimuth compass for establishing magnetic variation, and two 'meridian' compasses – in this period English mariners often used 'Channel' compasses which were precorrected for local magnetic variation, and 'meridional' compasses when venturing further afield.[29] Finally, he bought himself a new Davis quadrant, and a brass Jacob-staff (£6 10*s* for the pair). His invoice came to £110 6*s*[30] – about twice his annual wage as a yacht captain.[31]

The Davis quadrant was the seventeenth-century industry standard for ocean navigators. It dated from the 1590s and was a significant improvement on the medieval backstaff. This was itself a rather belated development of the cross-staff, which dated from the time of the Old Testament.[32] The key to the backstaff was its use of a shadow vane, so that the operator didn't have to hold a stick to his eye and look directly at the sun. The Davis worked on the same principle, but used two graduated arcs, one of 60° and one of 30°, to allow for finer adjustment. Accuracy to within one sixth of a degree – 10 nautical miles – was theoretically possible, although probably only on a calm day.[33] John Narbrough swore by his Davis, mentioning it by name in his *Sweepstakes* journal: 'The mouth of Port St Julian lies in the Latt of 49° 10' as I observed by the quadrant which Mr John Davis invented.'

Although the terms Jacob-staff and cross-staff have long been used interchangeably, in the seventeenth century they largely retained distinct

meanings.[34] In his section about the cross-staff in *Practical Navigation*, first published in 1669 and reprinted frequently, John Seller, the pre-eminent publisher of navigation texts in London, made no reference to the term Jacob-staff. Neither did Andrew Wakely's 1694 *Mariner*'s *Compass Rectified*, in which the cross-staff is referred to as a fore-staff. Collins' Jacob-staff was a pole of heavy brass, a surveyor's tool with a point at one end so it could be stuck in the ground, and a mount at the other for attaching his compass or theodolite.[35]

Collins' large, heavy and expensive 5ft quadrant was also made for land surveying, and intended for use on *terra firma*. Just stowing the enormous, crated instrument and its stand must have been difficult on board the diminutive *Merlin*, and lowering it into the longboat to get it ashore would have been a source of some anxiety. But with these tools and his chains and his measuring wheels, Collins was well kitted out to survey the shoreline from the land.

However, it is unlikely that he made a habit of it. There just wasn't time. Instead, from the deck of the *Merlin* he probably used the well-understood 'running traverse' technique, now known as the running fix, which had allowed so many Dutch mariners to survey the coastline of England without having to set foot on shore.[36]

As a slightly more accurate variation on the running traverse, he might also have used a technique known today as the 'abeam and four-point bearing', in which the surveying vessel sails a steady course as two bearings are taken of a fixed object on shore, one at 45° (four points) and one at 90° as it draws abeam. This creates a right-angled isosceles triangle – Collins would have called it an equicrural triangle – in which the distance sailed between the bearings is equal to the distance from the point.

Collins wasn't trying to fix his vessel's position, however, but the position of the object in relation to other objects on shore. By continuing on his track, keeping a steady course, monitoring the yacht's speed using the half-minute glass, and timing his progress with the hourglass,[†] he could repeat the process with the next point and, if the coastline continued to trend co-operatively, with the next one and the one after that. Lining up a

transit from the shore to sail along – a pair of trees, perhaps, or a headland and a house – would help with maintaining an accurate track. Speed and direction of the tide could be established by compass and log from the anchored longboat. At the end of each run he would have a series of triangles of known dimensions, based on a line of known length. For less co-operative stretches of coastline, he would have resorted to the mathematical laws of sines and cosines to resolve triangulations, where two angles and only one side were known, or two sides and only one angle.

Errors were, of course, inevitable in any method that did not involve setting foot on land, and they would accumulate. But by these means he could at least sketch in a series of prominent shoreside features, complete with the distances between them and their distances from his track. It then remained to reconcile the angles with true north, and fill in the gaps in the coastline by eye. As a method it was very far from perfect, but it was fairly efficient, and kept guesswork to a minimum.

Collins may well also have used a slightly more complicated but still fairly quick technique to establish his position offshore – and thereby the position of the sandbank or rock close to where he was anchored – which had been outlined by contemporary mathematicians and originally described to the Royal Society in 1671.[37] It is known today as the 'horizontal sextant angle' method, in which angles are measured between three fixed points ashore with the object of producing two intersecting circles to provide a position fix.

Whatever techniques Collins used – and if it wasn't one of these it was something equally trigonometrical – he was able to combine speed with a modicum of accuracy. Maybe at times there was more of one than other, but on the whole he made it work pretty well. To a modern navigator accustomed to satellite technology, the acceptance of such shortcomings will seem strange, even slapdash. But before the arrival of electronic aids, and especially before the advent of reliable paper charts and accurate instruments, the work of the navigator was necessarily subjective. The accurate delineation of a coastline was of less importance to one viewing it from the sea than relative bearings of prominent landmarks or headlands,

plus a reasonable idea of the depth. Such basic information was all that an experienced navigator would have needed, or indeed expected, to allow him to fix his position approximately before deciding what to do next.

Collins' Plymouth chart was extraordinarily good, although not without mistakes. In the north-west corner, for example, he placed Tremanton Castle on the wrong side of the Forder Lake inlet, which seems a strange thing to get wrong. But the inlet itself was too shallow to be navigable, even in the longboat, so from Beggar's Island, which is as close as he got with his soundings, that is where the castle appeared to be. He was in too much of a rush to wade ashore and check.

In spite of its flaws, there is no question that the Plymouth chart was a huge improvement on anything that was available before. And it took him a week.

Collins and the *Merlin* continued westwards. Taking advantage of a favourable breeze, he went straight from Plymouth to Falmouth, with the intention of surveying that harbour and the Isles of Scilly, before turning around and getting Fowey and Dartmouth in the bag on his way back to Deptford for the winter.

But the weather was fickle. On 19 September he wrote to the Admiralty commissioners again, this time from Fowey. Three times he had tried to make it across to the Scillies, which lie far out in the western approaches, 25 miles from Land's End, and three times he had been forced back into Mounts Bay. The islands would probably have to wait until next year. He was apologetic, but upbeat:

> I have measured all the Sea Coasts from the Start to the Lands End, taken the exact Latitudes of all places with the true bearings of all headlands, depths of water, setting and flowing of tydes with exact Deliniations of Plymouth, Ffowey, Ffalmouth, Helford, Mounts Bay

> &c, I hope at my returne to give your Hons great satisfaction in what I have done … If your Hons have any commands for me, pray let me have them at Dartmouth, where I am now going.[38]

The Scillies notwithstanding, their honours the commissioners in Mark Lane might have been surprised at what Collins was claiming to have achieved barely two months after setting sail from the Thames. But his great pace of work continued, and the quality of the surveys remained impressively high, all things considered. At Dartmouth, his reluctance to spend time setting up a baseline ashore shows in the sketchy nature of his coastline, which has mostly been filled in by eye. But the bearing of the approach to the town is plotted accurately, while his contention that its narrowest part is just a cable wide is quite correct.

A deep-water haven so straightforward of entry for a modern yacht with a dependable engine murmuring away beneath the deck, the Dart estuary is actually a challenge under sail, and was especially so for the square-rigged seventeenth-century sailor. Difficulties caused by the confined space in the narrow, steep-sided estuary were exacerbated by the unpredictable breezes that Collins warned of in his pilotage notes:

> The going in and out of this place is very dangerous … for if the Winds be either Easterly or Westerly, then the high lands which lie off each side, cause Overflows and Calms, sometimes blowing in and presently right out again, which hinders a ship in turning in and out, by putting them astays unawares.

In the absence of a co-operative southerly breeze, he recommended that his readers hire one of the port’s many tow-boats to haul their ships safely in and out of the river.

All the charts from this first summer of the survey tend to share the same problems, but in essentials their usefulness as practical aids to navigation is not in question. When used in tandem with the copious notes

Collins published alongside them in the *Pilot*, they would have contributed significantly to the safety of seafarers negotiating the tricky and occasionally treacherous waters of the English Channel.

King Charles was delighted. Pepys wrote:

> The King in discourse with me at Newmarket about Collins' present business of surveying our sea-coasts does say that we never had our coasts so well laid down, and that therefore he designs to encourage Collins in the work, and to that purpose has subscribed to his propositions.

Collins was granted a warrant from the Lord Chamberlain to use the title of Hydrographer to the King.[39]

Engaging and authoritative, the text of the *Pilot* is characterised throughout by Collins' personal experience. 'Fowey may be very easily known,' he wrote:

> … lying in between two High Lands; on the West side going in, is an old Church and Castle, and on the east side the Ruins of an old Church. The going in is a Cable's Length over from side to side, and no Danger; when you are in you may anchor before the Town, or run up above the Town.'

His readers are his equals, and he is a trusted voice:

> And whereas it hath been reported to be a Bar-Harbour, and that you cannot enter till half tide, I do assure you that there is no less than 3 Fathom at Low-water at Spring-tide: Here you may lie ashore to Wash, Tallow, or stop Leaks.

By way of illustrating Fowey's commodious proportions, he added a personal aside: 'In the time of the Dutch War, in the Year 1666, there was

above sixty sail of Virginia Ships put into this Harbour.' He must have seen this formidable merchant convoy himself, as a 23-year-old, perhaps from an escorting frigate. 'The Spring-Tides rise and fall 16 and 17 Foot; and it is High-water here at Full and Change* a quarter past five' – which is as true today as it was in 1681.

By November he had run out of time. On 5 November he wrote to the Commissioners from Topsham on the River Exe,[40] which because of its narrow entrance, dangerous bar and shifting shallows was not a commonly used bolthole. 'I advise no Man to venture into that Place without a Pilot,' he warned. For Collins it was just another step eastwards as he tried to get back up towards the Thames. The weather was horrible. What he needed was two or three days of steady south-westerlies to get the *Merlin* up-Channel past Portland Bill and on towards the Downs, but as he explained in his letter, so far he had been driven back into the Exe twice – the last time after splitting the mainsail in the middle of the night while trying to claw off a lee shore, and then shipping a huge sea over the bows that destroyed the boats on their chocks and stove in the cabin bulkhead. With the shredded sail thrashing from its boom and several tons of solid water swirling over her deck, for a few endless seconds the little yacht's survival was in the balance. But she rose, green water streaming from her scuppers, and 'with much difficulty' they made it back over the bar and up to the shelter of Topsham.

The nearest naval base where repairs might be put in hand at Admiralty expense was Portsmouth, 100 miles up the coast. In the Exe, Collins was forced to draw on the Commissioners' credit to obtain the necessary sailcloth, timber and rope to make his vessel seaworthy again, emphasising that 'I shall not make use of any thing but what may be necessary to cary on with safty to Portsmouth'. He remained positive, anxious to reassure his masters:

> I have visitted all the sea coasts from the Lands End to Poole, having taken a true delineation of all the sea coasts, harbours, bays, rivers, roads, creeks, the exact latitudes of all headlands, with the

> soundings and the setting of tydes, and for the tydes of taken the advice of ffishermen, who I find to be the best experienced, when I returne to yr honors, I doubt not but that you will be well pleased when you see what I have done.

While he was waiting for the Commissioners' response he passed his time usefully, November or no, sounding the river and delineating its drying sandbanks for his chart of the south Devon coast.

One of the inherent problems with whatever version of the running fix Collins was using in his survey can be seen in this chart of south Devon, which was bound into the *Pilot* as number 14. There were numerous potential sources of error. Apart from the chart's forgivably exaggerated arrowhead shape for Start Point, which is certainly the impression that headland's saw-tooth profile suggests when seen from the sea, and the less forgivable misplacing of Hope Cove 5 miles to the west of its actual position, its general rendition of the coastline from Exmouth to the Start looks commendably accurate. The overall trend of the coast, north-east by north to south-west by south, is only about half a point out. The distances between Start Point and Berry Head, and Berry Head to Exmouth, are correctly proportionate with each other, and also with Torbay's sheltering, east-facing expanse. But according to the scale on the chart, in 'English miles' – even if he means them as nautical miles – the distances themselves are enormously exaggerated, by more than 20 per cent. Such an error could have various causes: inaccurate timekeeping when sailing along his nautical baseline, or keeping an inaccurate course. It could also be caused by an inaccurate log, or by miscalculating the strength of the tide, or by any combination of the four. Given the magnitude of the mistake, and Collins' acknowledged experience and competence, it is tempting to suggest that the engraver simply got the scale wrong. But he didn't – a manuscript copy of this chart survives which has the same scale,[41] and in any case Collins repeats the error in his pilotage notes. Apart from the elongated distances, it's another excellent chart, which nevertheless serves to show that some things just shouldn't be rushed.

After repairs to the *Merlin* at the boatyard in Topsham, Collins was back at Deptford to pay off on 20 December.[42] Of the Deptford that Greenvile Collins knew, nothing is left today. Some 6 miles downstream from London Bridge, on the south bank of the Thames, the Royal Dockyard was a huge, smoky, noisy, malodorous industrial site that dominated the waterfront, where hundreds of men worked in peacetime, and thousands during times of war. It had grown to occupy some 600ft of river frontage since its founding by Henry VIII, and was expanded and improved under Cromwell's Commonwealth, when a mast pond, crane house and three new wharves were added to an infrastructure that already included workshops, slipways, offices, a large Tudor storehouse and a wet dock.[43] Many of Queen Elizabeth's 'great shippes' that fought the Spanish Armada were built at the dockyard, and it was at Deptford that the Queen knighted Sir Francis Drake when he returned from his circumnavigation. Drake's ship, the *Golden Hind*, remained there as a visitor attraction until she eventually rotted away.

The Royal Dockyards at Chatham, Woolwich, Portsmouth and Deptford were the largest and busiest industrial sites of the era, pulling in from all over the kingdom, and from as far afield as the Baltic and northern Russia,[44] massive quantities of timber for masts, spars, frames and planking, flax for sails, hemp for ropemaking, iron, tallow, nails, blocks and cordage, not to mention thousands of guns from the cannon foundries of Kent and Sussex. From the noblest first rate to the lowliest sloop, between the Restoration of 1660 and the Glorious Revolution of 1688, some 120 ships were launched at the royal dockyards, twenty-seven of them at Deptford.[45] If he lived long enough, practically every seaman and officer in the navy would serve aboard a Deptford ship at one time or another, and Collins was no exception. The *Speedwell* was Deptford-built, her splintered timbers now washed by the tides off Novaya Zemlya. So too was the venerable second-rate *Triumph*, in which Collins served at the Battle of Solebay back in 1672.

Many of the frigates familiar from his Mediterranean voyages were Deptford ships, including Sir Robert Robinson's *Assurance*, John Wood's *Diamond*, and of course the leaky old *Leopard*. The seventy-gun *Lenox*, first of the '30 great ships' signed off by Pepys in 1677, was built at Deptford, and one more third rate and two second rates followed her down the dockyard's slipways within four years.

Charles II liked to attend the launches of his new ships, particularly at Woolwich and Deptford, which were so convenient for Whitehall. He would be rowed downriver in state from the palace steps, stand on the poop deck of the new vessel, take a swig of wine, splash the rest of it over the deck, and hurl the goblet into the Thames as the ship slipped down the ways. Drums and trumpets provided an accompaniment to the spectacle.[46]

As the *Merlin*'s crew picked up her fore-and-aft mooring off Deptford's busy foreshore that chill December day, Collins would have cast an appraising eye at the gigantic, half-built skeleton of the second-rate *Neptune*, ninety guns, the last of the '30 great ships' to be constructed there.

He was home in Westminster for Christmas. Elinor must have wondered where he'd got to, but at least this time he had a good period of leave. She was pregnant again, and the new baby, Barbara, was born in mid-March and christened on the 19th. Then in April the Admiralty issued Collins with his new warrant, and after another week with the family, he set off on the second season of his great survey. 'The season was unusually wet, with rain and thunder,' the Deptford diarist John Evelyn noted disconsolately.[47]

Collins had big plans for 1682. He sailed straight around to the south coast, explaining in his *Pilot*'s introductory remarks that as the Thames Estuary had been thoroughly surveyed by Trinity House at Deptford, and was well provided with their pilots, he had decided to trust in their knowledge and use their charts in the *Pilot*. 'All the rest of the Charts are my own survey.' No doubt that was his intention.

He began the new season with a thorough, large-scale examination of Rye harbour in Sussex, just over the border from Kent. He was obviously pleased with the result. Today any approach to Rye is apt to make mariners very thoughtful, so shallow and tidal has it become, but for Collins it was a

busy port with ‘no less than 15 and 16 foot at Low-water, as you may see in the Chart, Number 8, where the going in is so plainly demonstrated, that you need have no other Directions’. Two sets of leading marks were set up on the shore by the local harbour office to guide mariners in past the East Bar and then up the river to the town. The prominent Tudor fort at Winchelsea, now known as Camber Castle, made a useful landmark just above the beach.

He wrote off all the minor harbours along this length of the coast as beyond the scope of his project. Thanks to their shallows and sandbars, Cuckmere, Shoreham and Newhaven were suitable only for those with local knowledge: ‘I might have said more of these Bar-Harbours, but I leave it to Coasters, and do not recommend it to Strangers, they being Harbours of little Trade or Resort.’ He did concede that the River Arun was a safe enough haven now that it had a new pier, but Cuckmere, he warned, ‘sometimes by Stormes is stopt up by the beach, and by great Land floods is opened again’.

So he sped past these minor ports, pressured for time as always, but off the towering chalk cliff of Beachy Head he plied the lead doggedly to investigate reports of shoal water close in to the shore: ‘But I could not find it; however, it may be a small Spot, and hard to find, therefore the best way is not to come too near it.’*

In the absence of charts along this section of the coast, Collins’ pilotage notes go into useful detail. The low, sandy headland of Dungeness was ‘very bold’, so you could sail past as close in as you dared, unlike the Ripraps shoal between Dover and Calais, now known as the Varne and very prominently buoyed, which had just 15ft over it at low tide. Of another area of shoal water called Gunman Sand, closer to the English shore, modern charts show no trace. Further west, towards the Isle of Wight and the approaches to Portsmouth, Collins sounds a doom-laden warning about the dangerous shallows off Selsey Bill which resonates even now:

> I will not give any Directions to sail through them, nor within them. There lie some other banks within them, which I forebear to speak

> of. The only and chief end of my Business is to give good Directions how to avoid these shoals, that have proved so fatal to many ships.

His instructions were clear: pay attention to the buoys, don't let Dunnose Head bear south of west, stay in 18-fathom water, and watch your tides:

> The great Reason why so many ships have fallen in on these shoals, is the great Indraught of the Tide setting strong into St Helens 8 Hours or more; the latter part of the Flood sets in to St Helens. My advice is, That when you are near to this Place in the Night-time, or thick Weather, to be very careful, and keep your Lead well. In little Wind or Calms you shall be drawn in here to Admiration, by the strong Indraught, which if you find, anchor in time.

The Isle of Wight is noted for its tides. This high-sided, diamond-shaped island, 23 miles across, presents a wedge-shaped obstacle to both the incoming and outgoing tidal streams of the English Channel, diverting their powerful flows north and south and presenting the mariner with challenges that seem as much conceptual as practical. At some stages of the cycle the island sits in the middle of a giant whirlpool, with the tides flowing westwards along its northern shore and eastwards along the south. There are numerous inshore quirks and eddies known only to locals, such as the in draught off St Helens that had clearly caught Collins out at least once. Sandbanks and mudflats complicate the shelter of the Solent, where the tide is never quite slack. The out-flowing stream in the narrows at the western entrance, guarded by Hurst Castle, another of Henry VIII's forts, can run at nearly 5 knots.

So Collins paid special attention to the area, and wrote detailed pilotage instructions in support of an excellent chart of the island and its associated mainland ports, which include Portsmouth and Southampton. Once again, he seems to have been pretty satisfied with his work, breaking off at one

point to remark: ‘I refer you to the Chart, which is so plain, that there needs no Directions.’

Collins’ Isle of Wight chart is drawn on a large scale of 1.4 miles to the inch. What sort of miles, he doesn’t say. The most useful mile for navigators is of course the nautical mile, one minute of latitude, or a sixtieth of a degree. Knowing your latitude gives you an idea – actually, half an idea – of where you are in the world. Modern charts do not need mileage scales, because they have scales of latitude running up the sides.

It was less simple in the seventeenth century. Cartographers did not necessarily agree about latitudes, and not all charts had latitude scales. There were also few internationally agreed standard units. Several different measurements of a mile were in use. Some charts offered navigators a variety of scales, in miles or leagues, on the same chart. The respected publisher Van Keulen of Amsterdam, whose five-volume sea atlas *Nieuwe Lichtende Zee-Fakkel* was being published just as Collins began his great survey, tended to provide scales of ‘Duytsche Mylen’ at 15 to a degree, ‘Leguas de Espana’ at 17⅔ to a degree, ‘Sverdsche Myler’ at 113/7 to a degree, and English and French Leagues at 20 to a degree. Some charts by John Seller bear this same legend, of 20 English leagues, or 60 miles, to a degree. So, on these, at least, an English mile is a nautical mile.

But there was plenty of other mud in the water. A new series of British county maps was being produced by Robert Morden at the same time that Collins was working on his *Pilot*, and most of these provide three scales, in miles of slightly different lengths, with no clue offered as to what sort of miles they are supposed to be. The Tudor cartographer Christopher Saxton produced a big wall map of England and Wales in 1583, in which the three scales represented lengths of 50, 55 and 60 miles to 1° of latitude. A contemporary of Collins, John Ogilby, complained about local country

miles which were considerably longer than a statute mile, and were far from consistent.[48]

So it could be expected that Collins' scales are not quite consistent. In the text and tabular data of his four journals, he never specifies which type of mile he is using, but since most of these occasions relate to latitude, he can be assumed to mean nautical miles. On the printed distance scales of his charts, however, we find miles, English miles, leagues and English leagues. Only on those charts which have both distance scales and latitude scales is it possible to check whether his miles are intended as nautical miles or not, by comparing them with the degrees and minutes along the edges. There are just fifteen of these charts, out of a total of forty-seven that appeared in the first edition of the *Pilot*, and on twelve of them the miles in the scales are nautical miles. Of the other three, number 29, a beautiful chart of the Irish Sea from Holyhead to the Mull of Galloway that includes the Isle of Man, has a scale in 'English miles' that appear to be statute miles. The unnumbered chart of the St George's Channel, and Chart Q of the Moray Firth, have latitude scales along their western and eastern edges, but no mileage scales to compare with them.

On the remaining thirty-two charts, it is not clear what sort of miles Collins is using. One of them has a scale rule with no units specified, and some have no scale at all. It seems an oddly random way to proceed for a man who could be admirably scientific when he wanted to be. On a separate, large-scale survey of the River Medway, for example, that Collins was commissioned to make in 1688,[49] he very clearly sets out 'a scale of 1760 yards being one mile' – which is a statute mile of precisely 5,280ft, as enshrined in English law in 1593. In an extraordinarily detailed, large-scale survey of the River Thames between London Bridge and Cuckold's Point that Collins undertook in 1683,[50] each of the seven large sheets has a scale rule delineating the exact length of just 400ft.

But this lack of consistency in the scales of the charts in the *Pilot* is perhaps less surprising than it seems. He could be accurate when he needed to be, but Collins was above all a practical navigator, well aware that this science of which he was supposedly a master was also an art. He was

perfectly capable of surveying the wharfs and shipyards of the Thames to an accuracy measured in feet, but he knew as well as anyone that such precision was just not relevant at sea. For much of the time, navigators operated on the level of educated guesswork. On any given grey day in the English Channel or the Irish Sea, very few of Collins' readers would be able to say with certainty whether a headland was 4 leagues away or 5, and few would care very much. The important thing was that it was in sight, and that by taking a bearing and glancing at the chart, the navigator could judge whether his ship was safe on its heading, or standing into danger. Coastal features that were puzzling at a distance had a way of resolving themselves as they got closer.

It was an era when seamen measured speed by trailing a piece of knotted twine over the stern, tried to steer within half a point each side of a compass course, took a stab at estimating leeway, and had little to no idea of what the local magnetic variation might be. The question of whether a chart was using statute or nautical miles was quite low on the list of a navigator's concerns.

The *Merlin* was back down in the far south-west by the end of June 1682. It is a challenging area for navigators. The tide swirls continuously around the steep, bluff mass of Land's End as the moon exerts its upward pull on sea levels, augmented every fortnight as it aligns with the lesser but still significant gravitational attraction of the sun. The streams can run at 21/2 knots.

Land's End itself, jutting far out into the Atlantic, is guarded from the west by the Longships, a jagged rank of rocks which are plain to see on a fine day, a mile or so off the westernmost tip of the peninsula. But in murky weather, unmarked then by any light or beacon, they could be hard to spot from seaward against the cliffs, and at night, even in calm conditions, the

boom of the constant Atlantic swell meeting the mainland could drown out any murmurings made by the surf on this dangerous, off-lying reef.

Even more treacherous, just to the south of the Land's End peninsula sits the Runnel Stone, known to Collins as the Rundlestone: a rocky cluster rising steeply from a shelf on the seabed, ready to rip out the bottom of any ship that cuts the corner too close. Then, midway between the Isles of Scilly and the southerly peninsula of the Lizard, in deceptively open water, lurks Wolf Rock, usually labelled Gulfe on seventeenth-century charts: a single pinnacle of ancient lava rising from the depths to just break the surface, with 40-fathom water all round. Finally, 6 miles north-east of the islands lies the submerged regiment of the Seven Stones, their presence betrayed in heavy weather by turbulent seas.

And then there are the Scilly Isles themselves. This low-lying riddle of rocks, islets and larger islands enclosing sandy lagoons and shallow channels is essentially a weathered plateau, a drowned geological relative of nearby Bodmin Moor in Cornwall and Dartmoor in Devon, rising out of the sea as a tide-swept, oval archipelago measuring 11 miles by 5. To approach from any direction is to be faced by a seemingly unbroken wall of low-lying, surf-fringed granite with no obvious way into the islands and, as the tide sweeps you close enough to make out the extent of the surrounding dangers, no obvious way around them either.

Sir John Narbrough found out the hard way how dangerous the Scillies could be. In the early summer of 1673, he was returning from the Mediterranean on the *Fairfax* third rate, with a large convoy of ships under escort. The merchantmen were slow, and the admiral made his approach to the Channel with care, sounding frequently, remaining ever alert for enemy cruisers – England was still at war with the Dutch – and, characteristically, making nature notes as he went: 'Saw several sea fowl called herring fishers,' went one. 'I saw five small whales.' On 21 June he sounded first thing in the morning and found 75 fathoms under the keel. He noticed some strands of seaweed on the surface, of the kind that normally grows on rocks, so he sent a frigate on ahead to scout and report back if he saw anything. At 2 p.m. they had 71 fathoms, and at 7 p.m. 62 fathoms. They were taking it

slow: ‘Five leagues a watch,’ Narbrough wrote in his journal, or just under 4 knots. He thought they were probably to the east of the islands, and reduced sail as night fell. The wind was south-westerly, ‘a fine small gale’.

Just after two in the morning the lookout noticed a cluster of rocks going past to port. Narbrough immediately went about, firing guns as a warning to the others, but the wind had dropped and the *Fairfax* responded sluggishly, just as the tide began to drift her in towards the islands. They dropped the best bower anchor, just in time, and at daybreak found themselves with rocks on either side, uncomfortably close, the windmills on St Mary’s clearly visible at north-east by east, and clear water to the north-west. Getting out would require some exemplary seamanship. The admiral had a hawser passed out of the gunroom port and made fast to the anchor cable. As the hands hauled the ship around to face the right way, they let the sails fall, waited for the wind to fill them, and then cut themselves free and made their escape. None of Narbrough’s ships were lost, but it was a close call.

‘The cause of our falling in here was a great indraught of a current,’ he wrote, adding that the incoming flood tide was augmenting its northward flow, ‘which put most commanders and masters in this fleet out of their reckonings’.*

If the admiral later told this tale to Collins, perhaps when they were on the *Plymouth* together in the Mediterranean, he clearly took note. But actually aboard the *Fairfax* during this frightening close call with the Scilly Isles was Cloudesley Shovell, then a 22-year-old master’s mate, who – as we shall see in the next chapter – clearly did not.

The first edition of Collins’ *Great Britain*’s *Coasting Pilot* was furnished with not one but two small-scale charts of the English Channel, both of which included the Isles of Scilly. One is a multi-plate, fold-out affair bearing the numbers 5, 6, and 7 that includes a detailed inset chart of Brest harbour, positioned rather unhelpfully in the bottom-left corner; the other, Chart 4, offers less coverage of the Western Approaches but more of the Thames Estuary, and features an inset engraving of a sea battle. Neither can entirely have been the work of Collins. He simply did not have time to

survey such an enormous tract of sea. The larger one, with its inset of Brest and a scale of ‘English and French Leagues 20 in a Degree’ is probably of French origin. Chart 4, with its greater emphasis on the Narrow Seas, was perhaps based on a Dutch original. Navigators with a copy of Collins’ *Pilot* on board, having used one or both of these charts in planning their approaches to the Channel, could then pass on to Collins’ own Chart 19.

This addresses the worrisome area of sea between the Scilly Isles and the Land’s End peninsula. The chart extends from the mainland just east of The Lizard to about 15 miles west of the main island group, and includes a good deal of empty ocean to the south, liberally dotted with soundings to assist inbound mariners making their approach to the English Channel. On page nine of his pilotage notes, Collins advised:

> The Mariner having left the vast Ocean, and brought his Ship into Soundings near the Land, amongst Tides or Streams, his Arte must now be laid aside, and Pilotage taken in Hand, the nearer the Land the greater the Danger, therefore your Care ought to be the more.

Having navigated his ship across the sea, the master’s job was now to pilot it safely among the off-lying dangers on the coast. If he had been lucky with sun sights and careful with his quadrant, and kept his logbook up to date, he might have a reasonable idea of his latitude and, depending on how long he had been at the mercy of dead reckoning, a less precise notion of his longitude – which, since it was generally calculated in degrees east or west of the port from which the ship set sail, might at best bear only a notional relation to any longitudes in his charts or pilot books. From the phase of the moon the navigator would know where he was on the cycle between spring and neap tides. From his almanac, or from Collins’ *Pilot*, he would have an idea of the times of high water at the different Channel ports at ‘full and change’, from which he could work out the tide times on the intervening days. His almanac might also have information about the directions of the tidal streams, although if he was an experienced Channel navigator he

might know these anyway. And once his ship was in soundings – depths of 70 or 80 fathoms that indicated the approach of the coast – he also knew not only how far down the bottom was, but also what was down there.

As aids to determining one's position, Collins professed himself sceptical about the usefulness of bottom samples – the sand, gravel, stones or shells that would stick to the base of the lead, which was charged with a lump of tallow for the purpose:

> … which yet I think very uncertain, which I found by Experience lying becalm'd in the Soundings, when I very often heav'd the Lead, and found one Cast so different from another in Quality, and still in the same Depth of Water, that I would not have any to trust to it.

As a general rule, however, he did concede that the material on the French side of the Channel was usually coarser than on the English, where:

> … the Ground is finer in general; for five, six and seven Leagues to the Southward of Scilly, you will have from 50 to 60 Fathom water, fine white sand, with some red and black amongst it, and sometimes some small shells or pieces of shells, and at other times white sand only.

Sceptical or not, Collins knew that all information is potentially useful in navigation. 'The nearer the land, the greater the danger', and Chart 19 serves its purpose admirably for the navigator approaching the coast after a long sea voyage. Covering an area of more than 5,000 square miles, its 151 evenly spaced soundings start at 70 fathoms in the south-west corner, and even though the majority of them were plotted by dead reckoning, when out of sight of land – for even the 300ft heights of the downs behind Land's End would be invisible from the deck of the *Merlin* once she was about 25 miles offshore – they offer a reliably accurate impression of the gently ascending seabed. A few well-marked hazards are shown breaking the

surface. Wolf Rock is drawn as an obvious pyramid-shaped pinnacle, with a 40-fathom sounding on each side. The Longships reef is plotted accurately in relation to the western tip of the peninsula, so that any mariner venturing close in to the cape would be alert to the danger. Also engraved clearly is the hazard posed by The Brisons, known to Collins as Breezan: a cluster of rocks a few miles to the north. He noticed that these two outcrops line up almost perfectly with Wolf Rock, and his plotting of the transit running through them cannot be faulted. A bearing from another landmark at an approximate right angle would have been useful to help triangulate Wolf Rock's position, but there were none close enough: the Lizard is more than 20 miles away, and Land's End lies at too acute an angle for accuracy with a dry card compass. Collins marked the Seven Stones and the Runnel Stone with half-moon symbols to indicate that they could be seen at half-tide.

It wasn't easy, but he knew he was doing good work. When he encountered a substantial undersea hillock a few miles south-west of the islands, which rose to within 15 fathoms of the surface, he named it after himself: Collins Bank.* He wrote to the Admiralty commissioners from the Scilly Isles on 25 June:

> Since my departure from the River Thames I have surveyed part of the Sea Coasts of Kent, Sussex, Hamshire, and the Wight and am now at the islands of Silly, which place I find will take me up much more time than I expected, by reason of much bad wether which is usuall here, and the trouble and difficulty in the true surveying of it, the islands being many, besides aboundance of rocks many of which ly under water, and the tydes various.

Although he had left Deptford early in the season, the unreliable summer weather and his appreciation of the daunting task he had set himself were conspiring to put him under pressure of time. Mistakes resulted. South of the Land's End peninsula, he placed the Runnel Stone too far offshore at a good mile and half, when in fact the rocks lie just 7 or 8 cables, about three-

quarters of a mile, from Gwennap Head. Although the top of the rock was knocked off in the 1920s by an incautious 6,000-ton steamer, the *City of Westminster*, whose wreck lies nearby, in Collins' day the Runnel Stone could clearly be seen breaking the surface, and its position could have been plotted easily from the shore. It seems a strange error. But not as strange as his 20-fathom sounding in the channel between the Runnel Stone and the headland, which would be more than enough to convince an over-confident navigator who was not familiar with local waters that he could cut safely inside the rock, close to the cliffs, where the tide runs less strongly. Although any such navigator would be remarkably foolish, as the scale of the chart is far too small for plotting such an intricate inshore course, that hardly excuses Collins' error, which he compounds in his sailing directions:

> From Mount's Bay to the Land's End the shore is bold; and a Mile or a Mile and an half due South from the Land's End, lyeth a Rock called the Rundle-stone, and sheweth above Water from half Ebb to half Flood, and then under Water; there is 20 Fathom Water between the Land's End, and this Stone.

There is not. The sea bottom in that area is a submerged shelf, with consistent depths of between 6 and 7 fathoms between the headland and the Runnel, apart from one pinnacle, which Collins did not find, with just 11/2 fathoms over it at low tide – a problematic depth for all but the smallest vessels.

There are a number of possible explanations for this erroneous 20-fathom sounding – more than 35 metres – none of which can be put forward with any confidence. Maybe a careless hand launched the lead with a tangled line, which untangled itself as it was hauled back up. Perhaps the lead went into a very deep hole, alarming the local lobsters. Maybe in his notes Collins confused feet with fathoms.

Or perhaps, in his haste, he didn't get around to sounding there at all, and instead relied upon testimony from the fishermen of nearby

Porthgwarra, who had decided they could use this unsuspecting fellow from London to assist with their lucrative sideline as wreckers.

Collins' chart of the Isles of Scilly, Chart 20, is a masterpiece. Whether he made a start there in 1682 and came back to it the following summer, or whether he did the entire survey in one season, we cannot be entirely sure. In the *Pilot*, Collins states that he surveyed the Channel as far as Land's End in 1681–82, the Scillies, Milford Haven and the Severn in 1683, the east coast from Harwich to Edinburgh in 1684, Edinburgh to Shetland in 1685, the Irish Sea from Milford Haven to Chester in 1686, and Liverpool, the Isle of Man and the Irish ports in 1687. But scholars have disputed these dates, and indeed Collins' own letters contradict some of them.[51] Either way, the finished chart of the Scilly Isles still represents a phenomenal amount of work – so much, indeed, that it is highly unlikely that he started with a blank sheet of paper.

It goes without saying that he sought advice from local pilots and boatmen as to the best ways in and out of the islands, but he still needed to establish an accurate coastal outline. Since the English county map-makers Saxton, Norden and Speed had ignored the islands, the only printed renditions of the Scillies that Collins could have seen were small-scale efforts included on larger charts, usually of Dutch origin. These often followed Waghenaer's rather whimsical outline from the previous century, which placed numerous small outer islands in a semicircle around a single large one, with an inviting anchorage in the middle. As Collins' slightly rueful communication to the Lords of the Admiralty admits, the Scillies are a little more complicated than that.

Fortunately, although they had been largely ignored by commercial cartographers, the islands were seen as an important rampart in the seaward defence of the kingdom, and were therefore placed under the military governorship of a wealthy Cornish dynasty, the Godolphins, who had

overseen the Scillies since the time of Queen Elizabeth. And since soldiers are inveterate map-makers, there was an excellent military survey of the islands available, in manuscript, dating from the 1650s and centred on the eight-pointed Tudor castle on St Mary's.[52] As the king's man, Collins was almost certainly allowed to study it, and he made good use of the opportunity.

Drawn in coloured inks on linen, and measuring just 11in by 15, it probably saved him a month or more. Collins' favoured running-traverse method of delineating coastal features would simply not have been practicable among the islands' rocks and shoals, in tidal streams that are never still and seldom constant. The Godolphin map offered him a pretty accurate, ready-made outline of the islands' shores, and allowed him to concentrate on the areas where soldiers feared to tread, sounding the depths and delineating the transits and leading marks that are crucial to safe pilotage in these uniquely challenging waters.

This was not the sort of place where Collins could airily refer his readers to the chart, 'which is so plain, that there needs no Directions'. The chart was certainly plain, but directions were needed to underscore the difficulties of pilotage in and around the islands. They do so with intimidating eloquence: 'With this Mark you run in amongst many Rocks very terrible to behold, and the Marks difficult to be known.' The so-called 'sounds' that provide water deep enough for navigation among the islands are often no more than sandy, rock-strewn channels that can only be negotiated by following transits formed by convenient alignments of rocks or shoreside features.

The first difficulty was finding such marks. Here are Collins' instructions for rounding the southern shore of St Mary's, with a view to entering the anchorage in the centre of the islands:

> There are two leading marks to avoid the Spanish Ledge and Bartholomew Ledge; keep the high land of Sampson on the Stevern, and that will carry you clear of the Spanish Ledge, and being past it, then keep Castle Bryer, which is an high round rock, on the low-

> land of Sampson, and that will carry you clear of Bartholomew Ledge.

If the navigator was committed to sailing in, but struggling to identify the requisite rocks, and unable to turn around owing to the breeze or the tide, then Collins advised:

> … keeping a quarter of a mile from the Hugh, or if you keep sight of the vanes of the windmills, but not the mills, that is, keep sight of half the vanes above the Land, and that will carry you between the Bartholomew Ledge and the Stevern.

Compared with those of a modern chart, such as Admiralty Chart 34 from the UK Hydrographic Office,[53] the bearings of the three principal transits inscribed on Collins' Chart 20 are commendably accurate. For the Smith Sound transit, guiding vessels in between the islands of St Agnes and Annet, the two charts use the same two rocks – Castle Bryher and Great Smith – and the bearing of Collins' transit lies within half a degree of the Admiralty's. Rocks used by the Admiralty for the St Mary's Sound leading line, Great Minalto and Mincarlo, are not placed accurately enough on Collins' chart, but the clearing lines he does suggest, using Castle Bryher and the island of Sampson, would guide you in safely today. Finally, there is Broad Sound – which Collins describes as 'a dangerous Sound for those that are not acquainted' – for ships coming into the islands from the south-west. Collins' inscribed bearing differs from the Admiralty's by 4°, but only because he chose to use the edge of Great Ganilly, as opposed to its summit. Adjusted accordingly, his bearing is off by just 1°.

Even allowing for the fact that Collins was able to use the Godolphin military map as a starting point, his Chart 20 is a fine achievement. Nothing like it had been published before. Of course, if he had allowed himself more time, some coastal profiles would have been invaluable to show the shapes of key islands and rocks for those trying to identify the transits from the sea.

A bit more information about the tides might also have been useful, although the streams around and between the islands are so complex that these alone could have taken him an entire summer to survey. And the chart itself is not without its problems. Collins' north-western clearing line, for example, running from the St Agnes lighthouse across the southern portion of Burnt Island, does indeed keep ships safe from the dangerous Steeple Rock. However, it also runs very close to Carnbase, a rocky pinnacle that comes within 11ft of the surface at low water – a pinnacle of which Collins, and the local pilots and fishermen that he consulted, all seem to have been completely unaware. As he plied the lead on the big Atlantic swells, keeping a wary eye on the Steeple and the Nundeeps rocks, he never knew how close he came to knocking the *Merlin*'s rudder off.

Faced with a tricky pilotage challenge, navigators know that thorough preparation is the key to success. Collins' *Pilot*, like every pilot book of the area published since, probably put as many mariners off sailing to the Scillies as it encouraged. But if the navigator was prepared, and understood what the tide was doing, and was gifted with reasonable visibility and a co-operative wind, then the Scillies chart and the associated notes in the *Pilot* would help him get his ship safely into the anchorage off Hugh Town. And if all else failed, the islands were well provided with the other kind of pilots, waiting with their six-oared gigs, who could be hailed from the deck with a gunshot and a wave.

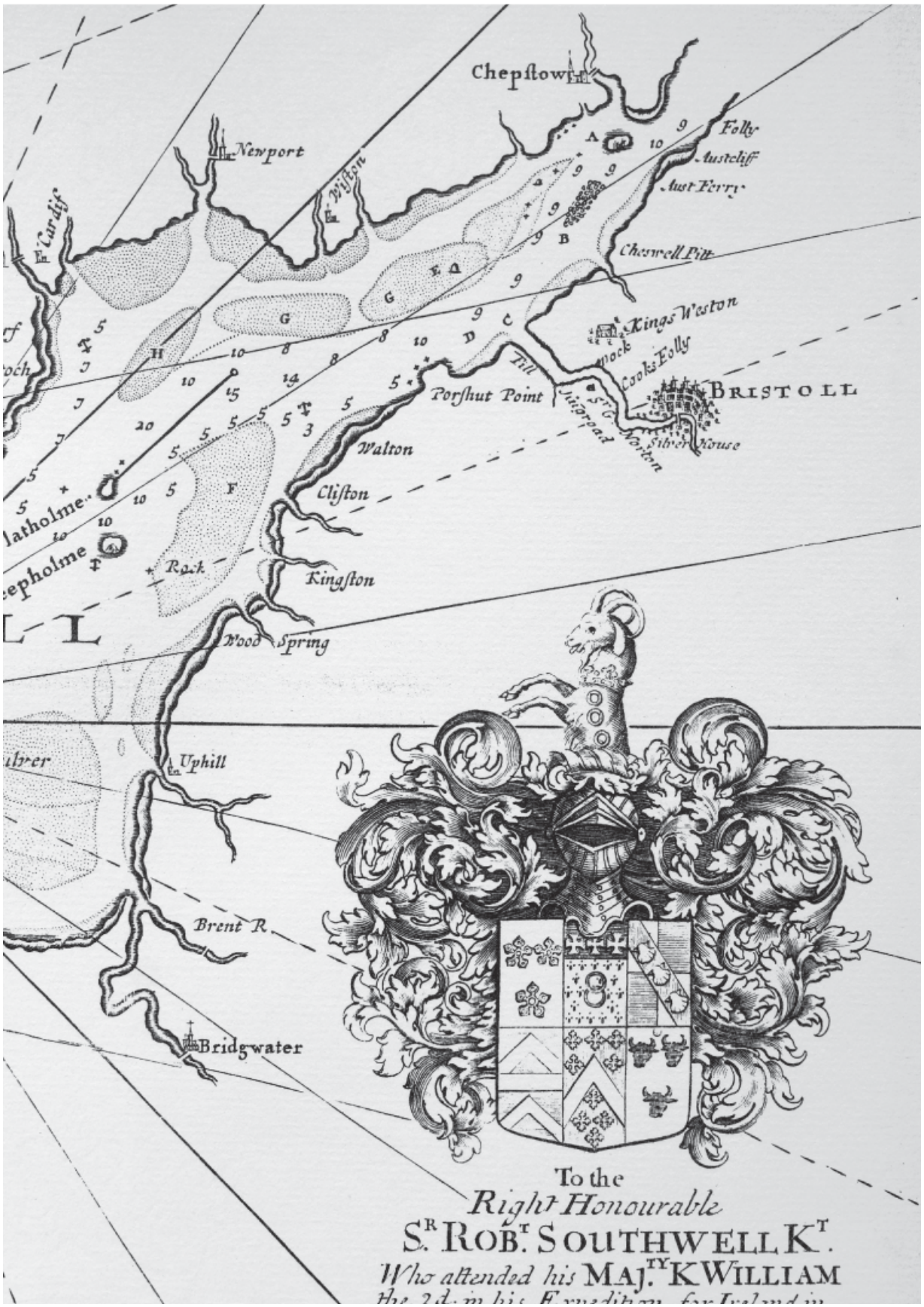
The survey continued apace. On 23 July 1682, he wrote again to the Admiralty commissioners in Mark Lane, this time from Milford Haven:

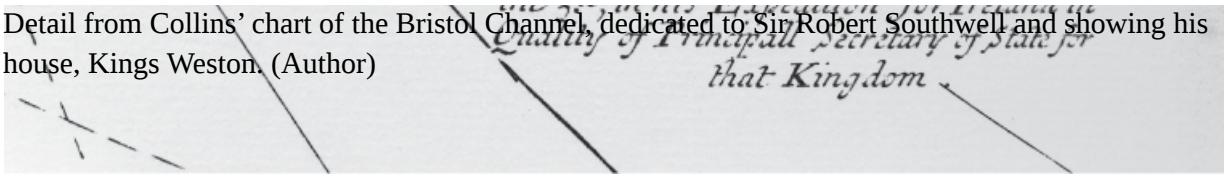
> Since my coming from the Islands of Scilly wch place I have exactly surveyed and sounded, & taken the true course and setting of the tydes amongst the Islaes and Rocks, I am now surveying the Coast of Wales, and so intend for Bristol and the North Coast of Devon & Cornwall wch I believ will be as much as the Season will give me leave to survey.[54]

Milford Haven, ‘certainly the best harbour in the 3 kingdoms’, was as far as he got during the 1682 season. During the winters he kept himself busy deciphering his notes, writing up his pilotage text, organising manuscript drafts of his charts for the engravers, and keeping in with his wealthy patrons. John Evelyn met him at St James’ Palace in February, where Collins had an audience with the Duke of York. The diarist wrote:

> I saw the sea Charts of Capt. Collins, which that industrious man now brought to shew the Duke, having taken all the coastings from the mouth of the Thames, as far as Wales, and exactly measuring every creeke, island, rock, soundings, harbors, sands, and tides, intending next Spring to proceed till he had finished the whole iland, and that measured by chains and other instruments. A most exact and useful undertaking.[55]

Collins’ chart of Milford Haven made its way into the *Pilot* as Number 24. It would be several seasons before he passed that way again.


Chepstow
Newport
Cardiff
Vifton
Folly
Austcliff
Aust Ferry
Cheswell Pitt
Kings Weston
Cooks Folly
BRISTOLL
Porshut Point
Till
Silver House
Walton
Clifton
Kingston
Wood Spring
Uphill
Brent R.
Bridgwater
To the
Right Honourable
S.R ROB.T SOUTHWELL K.T.
Who attended his MAJ.TY K WILLIAM



Detail from Collins' chart of the Bristol Channel, dedicated to Sir Robert Southwell and showing his house, Kings Weston. (Author)

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* A royal proclamation of 1662 had decreed that there should be no fewer than three compulsory meat-free 'fish days' a week.
* The most junior of the four Principal Officers of the Navy Board, after the Treasurer, the Comptroller and the Surveyor. [Latham p. 291.]
† At Chatham, Deptford, Woolwich and Portsmouth.
* The *Leopard*'s captain, Sir John Berry, went up to London in January, leaving the ship in the charge of his officers, and did not return. Collins might therefore have felt it reasonable to claim some shore leave for himself. Or he might have actually been ill.
* I.e. professing.
* He did miss one shoal named Panther Rock, which appeared on Lt Murdoch Mackenzie's survey of 1779. It now lies under the Victorian breakwater.
† We know from Collins' will that he owned a silver watch, but it wouldn't have been very accurate and was certainly not intended for use at sea. He is more likely to have kept faith with the log line and the hourglass.
* 'Full and change' – i.e. full moon and new moon, a fortnightly cycle.
* The existence of this mysterious shoal is asserted in Book 1 of John Seller's *The English Pilot*, published in 1671, with 'scarce two fathom' over it at low-water springs. Modern surveys show depths of 18m or more in that area.
* From Narbrough's description it appears that they were between the Western Rocks and the Retarrier Ledges, although the 42-fathom sounding he says he took while at anchor cannot be right. [NRS vol. 86 pp. 285–7.]
* Even though it already had a name, which he acknowledged on Chart 20: Poul Bank. Now called Pol Bank.

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5

Questions of Degree

Navigation (that useful part of the Mathematics) is a Science which has been highly valued by the Ancients, especially by our Ancestors of this Island; it being indeed the Beauty and Bulwark of England, the Wall and Wealth of Britain, and the Bridge that joins it to the Universe.

John Seller, Practical Navigation, 1676

Samuel Pepys combined ambition and tenacity with a sharp intelligence and prodigious administrative talent. But he was not born to possess power and influence. His mother was the daughter of a butcher, his father was a tailor, and they lived above the shop, just off Fleet Street.[1] Like most of his contemporaries, he had used the patronage of powerful friends and family members to get ahead. 'Chance without merit brought me in,' he confided to his diary,[2] acknowledging the leg-up from his cousin, Edward Mountagu, the first Earl of Sandwich. It was thanks to Mountagu that he got a job in Whitehall Palace after graduating from Cambridge in 1654, and thanks to Mountagu again that he found himself on board ship as part of the fleet that brought Charles II over from Holland at the Restoration in 1660.

Although well aware of how important such connections had been to his career, he didn't altogether approve. In particular he saw how the new king's tendency to reward loyalty with office was having a detrimental effect on the navy, by placing well-connected men with little or no seagoing experience in positions of authority. This was nothing new. It had been going on since Henry VIII's day, when commanders of the king's 'great ships' were from the same wealthy landowning families who raised militias for the defence of the crown. Cromwell created the office of General at Sea, but on the Protector's slightly more meritocratic watch some of his army commanders proved to be formidable fighting seamen as well. It was the example of such men as Blake and Monck, and their fearsome Dutch adversaries, Tromp and de Ruyter, that convinced Pepys of the vital need for professional naval commanders.

On hearing an officer described as having a character 'like a gentleman and an understanding man', Pepys remarked dismissively: 'a character which wants downright diligence, sobriety, and seamanship', and demanded to know instead about the man's qualifications for command.

> For as no man living can be more inclined than myself to favour a gentleman that is a true seaman, so neither is there any man more sensible than (after many years' observation) I am, of the ruinous

> consequences of an over-hasty admitting persons to the office and charge of seamen upon the bare consideration of their being gentlemen.[3]

Nevertheless, the principle of patronage remained deeply ingrained in English society, and so it was that in September 1682 a 39-year-old Greenvile Collins found himself at Kings Weston, the Somerset mansion of Sir Robert Southwell, baronet. The house overlooked the mouth of the River Avon, which flows down from Bristol, and commanded views to the south and west over the Severn Estuary, where Collins was at work on his survey. As a naval officer engaged on the king's business, Collins naturally came to the notice of the baronet, who liked what he saw in the capable seaman and set him a challenge that appealed to the intelligent spirit of investigation in both men. Collins had a reputation as one of the navy's scientific officers, and Southwell was a Fellow of the Royal Society, whose large estate included a curious underground cavern known as Penpark Hole.

The cavern was thought to have been found by some local lead miners and had been explored thirteen years before by another scientific sea officer, Captain Samuel Sturmy. At the time, Sturmy had just submitted his *Mariners Magazine* textbook to the king, so it may have been the king himself who encouraged him to investigate the newly discovered hole. Sturmy reported that the water down there was fresh, in spite of lying some distance below the level of the nearby estuary, and that his assistant, 'a mine-man', had ventured into a long gallery, seen an evil spirit, and refused to go any further. Sturmy descended into the Earth to a depth he estimated to be 32 fathoms. Local legend inevitably blamed his death shortly afterwards on the cavern's evil inhabitant, but a report of his findings was duly sent back to London.

Collins and the baronet hit it off, according to a letter Southwell wrote to the Royal Society, in which he speaks of himself in the third person:

> Captain Collins, commander of the Merlin Yeacht (who is by His Majesty appointed to take a Survey of the Coast of England) coming into the Severn to that end, and visiting Sir Robert Southwel near Kingrode, and entertaining him from time to time with the Adventures of his Navigation (having shared in the late Voyage with Captain Wood to Nova Zembla, and formerly Sayled in the East Indies near as high as Japan) Sir Robert on his part, told him how the story of this Hole had amused the Country; and how the said Narrative had formerly been sent to His Majesty and the Royal Society; and that there wanted only some courage, to find out the bottom of it. The Captain presently resolved to adventure, and so on the 18 and 19th of September 1682, he took several of his men, with Ropes and Tackling fitting to descend, with Lines to measure any Length or Depth, also with Candles, Torches, and a speaking Trumpet.[4]

Collins set to with his customary energy, and determined that the actual maximum depth of the cave was less than Sturmy's estimate, at 39 yards. It opened out into an 'irregular oblong' some 75 yards long, 41 yards wide and 19 yards high, where there was a large freshwater pool a couple of fathoms deep, and signs that at its highest the water level was 18ft above the ground on which they stood. They discovered various tunnels and passages which Collins traced in a detailed diagram that he presented to the baronet, and contradicting Sturmy's calculations he reckoned the lowest level of the cave system lay about 60ft above the highest tides in the Severn. The speaking trumpet proved unnecessary. No evil spirits were encountered.[5]

Southwell was an eminent diplomat and Member of Parliament, and just as people like him needed people like Collins to survey their haunted underground cave systems, people like Collins needed people like Southwell to get ahead in life. So when Collins' chart of the Severn Estuary appeared, it was dedicated to Southwell, and included a miniature view of his house, Kings Weston, set in a grove of trees. And the companion chart

of the River Avon, although not dedicated to Southwell, pays him a dual compliment. It not only shows the house, again, but the goats in its illustration of the gorge are a sly reference to his coat of arms.[6]

This was not just a courtesy. Southwell was a subscriber to the *Pilot*. Publishing was a hand-to-mouth business, and map publishing in particular required significant investments of time and money even before printing could begin. Copper plates of the size Collins needed for his charts cost 24*s* apiece, and the engravers were paid £5 for their work on each one.[7] And although Collins was working for the king, and by all accounts the king continued to be happy with the work – Pepys overheard Charles boasting about the survey 'with pleasure' to some French visitors 'that he was but just now causing charts to be made of our coasts, we having to this day none but Dutch'[8] – the monarch was not a great one for paying his bills.

Even established publishers struggled with the economics of map-making. Advertisements placed in the *London Gazette* by John Seller, the principal London map-maker at the time, trace the fortunes of his business as it expanded and contracted over the years, from his main premises in Wapping to shops in Exchange Alley, Pope's Head Alley, the West Side of the Royal Exchange, and Westminster Hall. As publication loomed for the Mediterranean volume of his *English Pilot*, Seller tried to share the risk by taking on partners, and eventually relinquished the rights to the work.[9] It was a tough business.

Collins needed financial backing to get his charts produced. Over two pages in the first edition of his *Great Britain*'s *Coasting Pilot* he listed 'The Names of those Persons that Incouraged this Work by Subscription, and Advancing money towards the Charge and Printing thereof for the Publick Good'. They included institutions such as Trinity House as well as senior naval people, the burghers of coastal towns and cities who had taken an interest in the survey, powerful politicians and courtiers, helpful local landowners, and numerous fellow naval captains who must simply have been supportive friends and contemporaries. He wrote a lot of letters: the list contains more than 150 names.

Obviously with more than three times as many people on the list as there were charts in the *Pilot*, not every subscriber got a dedication. But some were honoured with two, including the genial Sir Robert Southwell, whose name appears on both the Bristol Channel chart and also on Collins' elegant rendition of Kinsale. The dashing Cloudesley Shovell was another, an old friend from Mediterranean days to whom Collins dedicated his chart of Blakeney harbour, close to Shovell's Norfolk birthplace, as well as the chart of Cardigan Bay. One chart is dedicated to John Colson, an almanac publisher and teacher of 'the mathematical sciences' based in Wapping, who worked as an examiner at Trinity House.[10] It may well have been Colson who subjected Collins to this ordeal some years before, when he sat for his master's ticket, and it might have been the memory of this exam that inspired Collins when selecting an appropriate chart for dedication – southern Shetland, where he had made his first survey, in perhaps his first voyage as a qualified master.

When it came to dedications, some people were too important to ignore even if they hadn't come up with a subscription. Samuel Pepys was one: his name is not on the list of subscribers, but the chart of Harwich, his Parliamentary constituency, is dedicated to him as 'Secretary to the Admiralty of England, President of the Royal Society, Master of Trinity House'. King William's brother-in-law, George, Prince of Denmark, was honoured on the chart of the Orkney islands, which has a helpful inscription in the corner explaining that they were Danish territory until 1472. The Lords Commissioners of the Admiralty received their acknowledgement on the magnificent three-plate gatefold chart of the English Channel that only appeared in the *Pilot*'s first edition. Remembering his Far Eastern adventures, and the stories with which he regaled Sir Robert at Kings Weston, Collins also owed a tip of the hat to the gentlemen of the East India Company. For them he selected Chart 19 as the most appropriate, for both outbound and homecoming voyagers: Land's End, the Lizard and the Isles of Scilly.

Sailors are a notoriously conservative species. A Roman anchor dredged out of the mud at Deptford could have been slung from the hawse of a Stuart third rate and no one would have noticed the difference. Its shape had hardly changed in a thousand years. When it came to deciding on a cartographic projection for the charts in his *Pilot*, Collins revealed himself to be just as resistant to change as his grizzled shipmates, or perhaps just fully aware that anything he tried to do with his charts that looked too clever or scientific would not be trusted.

The difficulties of representing a spherical surface on a flat plane had exercised cartographers and mathematicians for centuries. Many different projections had been developed, from the earliest azimuthal maps based around a central point, to models based on the mathematical properties of cones and cylinders. The simplest of them is effectively a bird's-eye view, a rendition of the surface as if seen from directly overhead, with meridians of longitude and parallels of latitude creating a lattice of squares. When used for small coastal areas, the plane charts drawn on this principle are perfectly adequate for navigation. In the early sixteenth century, however, Portuguese seafarers found that a more refined projection was needed for long ocean passages – one that took into account the fact that meridians are not parallel, but converge towards the poles. A rhumb-line course simply drawn across their changing angles with a ruler is not a straight line in reality, but a spiral.

Mercator published the famous projection that bears his name as an aid to these trans-ocean navigators, so that they could continue to shape courses on their charts as straight lines. He kept the meridians vertical but spaced out the parallels as they moved away from the equator, thus straightening the spiral, and first used it on his map of the world in 1569. It took a while to catch on. More than a century later Collins and his contemporaries were still showing very little interest. Notwithstanding the example set by his mentor Narbrough, the only Mercator chart that Collins ever drafted was

the rather dubious one in his *Leopard* journal, which alongside its companion ‘plaine sea chart’ was merely a teaching aid for his teenage pupil, the Duke of Grafton. All the charts in the *Pilot* are plain old plane charts, as only at their smallest scale could they have benefitted from Mercator’s maths, and then only marginally. The errors inherent in drawing a straight-line course between Cork and the Bristol Channel on Collins’ unnumbered Irish Sea chart, for example, would barely figure in significance compared with those traditional sources of uncertainty for the sailor – wind, tide, compass error and the skill of the helmsman. Collins knew all about Mercator’s projection, of course, and would certainly have studied the mathematical tables for its construction in Edward Wright’s influential textbook *Certaine Errors in Navigation* – although perhaps only because he had to explain it to young Grafton in the morning.

For Collins’ seafaring customers, the value of the *Pilot* lay in its clear, simple and unadorned charts, and in the compendious pilotage notes that he wrote to accompany them. Having surveyed the western coasts and harbours as far as Milford Haven in 1681–82, the second phase of his grand project took him up the other side of the country.

Collins marked this eastern phase of the survey with a completely new text section,* introducing it just as he had at the front of the *Pilot* with an explanation of the various symbols and abbreviations to be found on the charts. So soundings were in fathoms except, he explained, in a few select estuaries where they were in feet, with their depths at high- and low-water spring tides shown one on top of the other. ‘Where you see an half Moon placed by any Rock or Sand, it declares that such Rock or Sand is to be seen at Half-tide.’ Arrows showed the direction of the incoming flood tide, and the letter D indicated an area that is high and dry at low water. The repetition of these short but important paragraphs in parts one and two suggests that Collins originally intended to offer the *Pilot* in separate volumes, so that his customers could buy just the chart coverage they needed.

In the new section, ‘The Second Part’, he also restates his position regarding the complicated network of sands and channels in the Thames

Estuary, explaining that he felt it best to leave these areas off the Kent and Essex coasts to the experts at Trinity House of Deptford. The House surveyed the sandbanks regularly – Pepys complained in 1683 that they had not done so for two years, when they used to do it annually[11] – and their numerous well-qualified pilots were constantly on call to guide ships through them.

> I have laid the Sands down in the Sand-Chart from the Thames to the Downs, and from the Thames to the Buoy of the Gunfleet, as they were most carefully survey'd by the Trinity-house; but all the rest of the Charts or Maps were actually surveyed by myself.

That was not quite true. He had learned a useful lesson in the Scillies. Even when given a head start by the impressively accurate Godolphin military map, his survey of the islands still took weeks. In his third surveying season, he seems to have resolved to make use of any existing sources that could be helpful, including North Sea charts, probably Dutch or Dutch-derived, and trustworthy Trinity House manuscript surveys. Adapting existing charts in this way would enable him to focus on individual ports, harbours and anchorages which had not been adequately covered before, as well as to try to pinpoint the latitudes of various prominent headlands. He would also try to establish the positions of the offshore sandbanks which are such a feature of any hydrographic representation of the North Sea.

Some of these, like the Well Bank and the Dogger, were not shallow enough to constitute a hazard, except possibly in extreme weather, but their soundings offered a useful position fix for navigators. Others were positively dangerous. After a catastrophic shipwreck the year before, official minds were particularly focused on two of them, the Leman and the Ower Banks, where the *Gloucester* third rate foundered in May 1682 with the Duke of York on board. The duke survived, but hundreds drowned, and the disaster shook the navy to its core.

The two banks lie close to each other some 25 miles off the Norfolk coast, and Collins took special care to locate them accurately, fixing their positions by triangulation using hired boats and crews. ‘Two very dangerous sands,’ he wrote in the *Pilot*, emphasising that they were made more so by the deep water all round, which shoaled rapidly from 20 fathoms to just 3 or 4 in a cable’s length. A ship sailing onto them would get no warning. The best way to cut safely inside them when on passage along the coast was to keep the mainland in sight: ‘I could not see the Land from the Mast-head of the Yacht when I rid at Anchor close by the Leman,’ he confirmed, ‘but being at Anchor 3 or 4 Miles within the Leman, I saw the church and land of Haseborough’.*

He was confident he had done a thorough job, writing to the Navy Commissioners in September:

> Since my last from Yarmouth Road I have survey’d all the sands thereabouts, and had for Pylotts the most knowing Pylotts thereabouts, I have taken great care about the Lemmon and Hower, having found its true distance from ye shoare by intersections of triangles, takeing by the help of two vessels between Haseborough and the sands of the Lemmon and Hover, with the soundings about them, collour and quallity of the ground, Latitude and settings of Tydes, wch I hope when your Hons shall see it, that it will have yr good approbation.[12]

Even though he had elected to use existing charts and surveys where they could be useful, he had once again set himself an enormous task. The new section of the *Pilot* was launched with three ambitious small-scale charts, which in Collins’ far from consistent scheme were labelled B, 3, and 2. Chart 2 covers the eastern coast of England from Dover up to the Humber, including a detailed, larger-scale, inset view of the River Thames, from Westminster to the sea. This is based on the surveys of Trinity House, in Hull as well as Deptford, and its inclusion of the institution’s lighthouses

and leading lights along the coast, all the way from North Foreland to Spurn Head, suggest that Collins' use of Trinity House surveys extended beyond the strict bounds of the Thames Estuary. His debt is acknowledged in the chart's dedication, to the masters and wardens of the Deptford office. Its focus is on the sandbanks and soundings that make coastal navigation in these waters such a challenge, and it extends only 30 miles from the English coast out towards the Dutch side of the North Sea.

Chart 3 covers the same ground at a smaller scale, at just under 9 nautical miles to the inch, and takes a step back to include the coasts of Flanders and Holland. Its overall layout mirrors closely that of several Dutch charts that Collins might have known, such as the one in Hendrick Doncker's beautiful *Zee-Atlas*.[13] Although its treatment of the Thames Estuary is not as thorough as Chart 2's, and some fictitious islands have appeared in the River Swale, its detailing of the shoals in Zeeland and the Zuider Zee, and of the great shallow bank known as De Bree Vierthien – the Broad Fourteens to Collins – is impressive, and points to its Dutch origins. Detailed or not, however, its scale is too small to be of much use for coastal pilotage. The chart's value lies more in passage planning around the cabin table, perhaps with a glass of wine, than in revealing the secrets of the shallows to a stressed ship's master trying to pick out spindly beacons in the rain.

For Chart B, which extends from Dungeness all the way up to Edinburgh and the Firth of Forth, Collins used yet another source for his coastal outline. The rather squashed shape of Kent, in particular, is quite different, while the Broad Fourteens are given a more dramatic sweep. The west-going trend of the coast from Whitby to the Tees is exaggerated by a good 10°. However, with the recent *Gloucester* disaster in mind, on all three of these charts Collins seems to have made an effort to achieve a consistent position for the Leman and Ower sandbanks. Their bearings to the sands from the Foulness lighthouse all agree within half a point, and their distances match almost perfectly.[*]

In that summer of 1683, Collins sailed all the way up the east side of England and into Scotland, a pace of work that made his two seasons on the south coast seem something of a dawdle. Notwithstanding the excellence of some of his earliest efforts – and the surveys of Milford Haven, Plymouth and the Isle of Wight, not to mention the Scillies, are particularly fine – by now he had acquired a proper understanding of just how long this business was going to take.

He was also beginning to realise that in spite of any airy promises he might have received from the king, actually getting payments and expenses out of the Treasury was more trouble than renewing the foretopmast stay on a third rate, and a good deal more time-consuming. The survey added significant extra costs to the running of the yacht, which Collins itemised for the Navy Board as 'Travelling charges, Boat hyre, Horse hyre, Pylotts, Guards, Assistants & other Contingent expenses at £200 per annum'. Elinor was pregnant again, and Collins was having to borrow money to keep both survey and family afloat.

It was a continuous struggle, and it went on for years. He was constantly in debt, writing to their Lordships in December 1682 to request that the *Merlin* remain in commission: 'The *Merlin* being now come at Deptford from surveying the Sea Coasts, I begg yr Hons will be pleased to indeavour that the said yacht may not be discharged, since the last winters discharge did put me to a great expense.'

They discharged her anyway. She was deemed to need a refit. In the spring Collins was given another yacht, the *Monmouth*, from which he appealed in April:

> The victualers have not as yet recd any orders from you for the victualing … I humbly begg that yr Hons would give them yr order for my Genll victualing as the rest of the yachts have, I stay for nothing els, and doe expect to be out till the end of November.[14]

Even though it was peacetime, Collins was probably not the only officer wondering how the navy's commitments could so far exceed its administrative capabilities.

The *Monmouth* and the *Merlin* were very similar craft, built in 1666 at Rotherhithe, on the south bank of the Thames – the *Merlin* by Jonas Shish near Cuckold's Point, and the *Monmouth* at the William Castle yard, a mile or so upstream near the Cherry Garden Stairs. As Collins slung his cot in the stern cabin of his new charge he would have felt immediately at home. She was a foot shorter along her keel than the *Merlin* at 52ft, but for all practical purposes, taking into account her generous beam and a modest draught of 7ft 3in, she was an equally capable survey ship.[15]

As he spent the weeks and months of surveying either on deck, in the longboat, or on shore, in whatever weather the British summer could throw at him, the apparent indifference shown by Treasury and navy officials might have encouraged him to speed up the task. From their warm London offices, his financial straits appeared to count for little. The sooner the survey was done, the sooner, perhaps, he would get paid.

Collins made steady progress up the coast, plumbing the depths, sounding the shallows, taking bearings and measuring latitudes as best he could while still trying to cover as much ground as possible in a short surveying season. The east coast is less hospitable than the south, not just because of its numerous and shifting shallows, but because the sheltering boltholes it can offer when the weather worsens are fewer and further between. Like some of the shallow anchorages in the Thames Estuary, these are areas where in gloomy weather it can be difficult to discern exactly where the shoreline lies. The mud and the sea share a uniform grey-brown hue which often seems to extend to the sky as well, and the mariner can easily be reduced to wondering which church or windmill is which, and whether those seabirds are swimming or walking.

He spent a lot of time on a detailed chart of the approaches to Harwich, dedicated to Pepys, and on a careful survey of the banks impeding the entrance to the busy herring port of Yarmouth, backing them up with thorough sailing instructions. They had to be thorough. The sands shifted

constantly. In the last five years he had heard of great changes in the channel known as St Nicholas Gatt: ‘Since the Sands have altered so much, I think it fit to give no farther Directions for sailing into this Gatt, but advise Strangers to take a Pilot.’

He could have spent even more time making sense of the dense network of channels in the Wash, and had he done so, the area would have warranted its own chart. But reasoning that Boston, Spalding and Lynn Regis* were places where only those with local knowledge would even think of venturing, he opted again to save time and rely on such notes and manuscript surveys as had been entrusted to him by the brothers of Trinity House. The only representation of the Wash in the *Pilot* is as part of the small-scale Chart 2.†

The Humber could also have occupied his resources for weeks, had he let it. He did give the shallow, brown, swirling water of the estuary an excellent chart to itself, but expressed his debt in the dedication: ‘To the Worshipful Corporation of Trinity House at Kingston-upon-Hull.’ By contrast, Collins paid particular attention to the diminutive tidal haven of Blakeney, on the north coast of Norfolk. Although a busy port at the time, it hardly seems to warrant a full page of the *Pilot*. Cloudesley Shovell’s subscription must have been quite generous.

North of the Humber, the coast of England gradually begins to assert itself, rising out of the sea and presenting fewer off-lying dangers to ships, and from here to the Firth of Forth Collins was able to concentrate his efforts less on sounding the approaches and more on producing succinct surveys of the area’s harbours and havens. He surveyed the anchorage within the sands at Holy Island, and the off-lying rocks and islets of the Staples.‡ Further up the coast he made use of a survey of Berwick by the military engineer Colonel Jacob Richards, which shows clearly the transit created by lining up a prominent white house within the castle walls, a white-painted patch on the walls themselves, and the southern end of the old pier. Richards is credited for his work in the *Pilot*’s notes.

There is a familiarity about Chart I which recalls the sketch surveys Collins made as a man-of-war’s master in the Mediterranean. The inner

harbours of Burlington,[§] Hartlepool and Scarborough were small, and they dried out at low tide, so the chart's value to the passing mariner lies in its surveys of their outer anchorages, sheltered from the west and north by quite high ground. Just eight soundings suffice to indicate Scarborough Bay's suitability as a useful bolthole, while the row of figures leading out from the pier at Burlington suggest a long pull to the south-east in *Monmouth*'s longboat, sounding every 600 yards or so, with another line of soundings tracing the boat's curving progress from the rocks off Flamborough Head across to the hamlet of Oburne.[¶]

Collins must have intended to fill in the gaps in his coverage at some point, because Chart I in the *Pilot* is followed by Chart L, tracing the River Tyne from the North Sea to Newcastle. It has one smaller inset plan of nearby Blyth and Seatown, and another inset of Sunderland and the mouth of the River Wear. All three views are on the same scale, and they join up with each other, giving the navigator a contiguous and usefully detailed view of nearly 20 important miles of the Durham and Northumberland coastlines. Newcastle in particular was a vital port for the coal trade, and the Tyne had been much surveyed over the preceding hundred years or so, with one manuscript chart that survives today, complete with sandbanks and soundings, thought to date from about 1570.[16] Collins' printed edition is an extremely accomplished effort, and with its dedication to the Master and Brethren of Trinity House, Newcastle, its cartouche suggests that once again he had access to the river pilots' notes, sketch plans and surveys. Leading lights at the river mouth guide ships in over the bar, and soundings are given in feet, with low-tide figures below the line, and high-tide figures above. As so often, something is amiss with Collins' scale, which over-reads significantly on both the north–south and east–west axes.

The chart shows how Collins added value to the Trinity House surveys not just as a cartographer, in laying out his manuscript drafts as clearly as possible for the engravers, but also as an editor, in working out how to combine these three plans on one plate. He could not find space for a fourth, however. His survey of the Coquet Island anchorage, which lies some miles to the north of Blyth, off Amble, might have deserved a page to

itself if some wealthy patron with local connections had come forward, like Sir Cloudesley Shovell did with Blakeney. But none did. So he placed it within the *Pilot*'s text, on page thirteen of the second part.

In a sea atlas of forty-seven charts it might seem odd to devote four of them to far-flung islands that were little frequented by English seafarers, but Orkney and Shetland were well known to the Dutch. One legacy of the persistent state of war that had existed between England and Holland in the years preceding the survey, and which was still going on between Holland and France, was the Dutch habit of sailing their laden merchant ships north around Britain, where they would be less vulnerable to capture. In his focus on these northerly isles Collins saw a hopeful opportunity to reverse the usual flow of traffic in the cartographic trade, by selling English charts to Dutch seamen. 'Between the Islands of Orkney and the Islands of Shetland is a small Island called Faire Isle, which is inhabited,' Collins wrote in his pilotage notes.

> The Dutch East-India Ships, as they go and come from India, sail between the Islands of Orkney and Shetland; and homeward bound they send ashore at this Faire Island for Letters of Advice; but commonly the Dutch East India Company send a ship to meet them here.

Dutch fishermen also knew the islands well. The herring fleet would begin its seasonal campaign in Shetland in June, and end in September. After praising the attractions of Bressay as a safe anchorage – 'There is no manner of danger in sailing in and out at Brasey-Sound. You may Anchor before the town of Lerwick in five, six, seven, eight, nine, or ten fathom water Landlock'd' – Collins added 'There have been five hundred sail of

Dutch Herring-Busses at a time in Brassey-Sound.' The harbour could supply fresh water, peat and 'great plenty of several sorts of fish'.

Bressay was, of course, the subject of Collins' first survey, when the *Speedwell* and the *Prosperous* pink called in on their way to the Arctic back in 1676, and he borrowed the longboat to take a few bearings and soundings. But even that early visit does not seem to have been the first time he encountered the islands. Just as at Fowey, when he remarked that the harbour had sheltered 'above sixty sail of Virginia ships' in 1666, in his *Pilot*'s sailing directions for Brassey he threw in a reference that also appears to be a specific personal reminiscence from his time as a youthful midshipman or master's mate: 'The Earl of Sandwich, in the year 1665, in the War with Holland, anchored here with the English fleet under his Command.' This throwaway line not only shines another glimmer of light on Collins' early naval career, perhaps placing him at the Battle of Vågen in August that year, but also raises another intriguing possibility. The Earl of Sandwich was Edward Mountagu, Samuel Pepys' relative and patron. If Collins sailed with Mountagu, and made a good impression, it could explain how he first came to Pepys' attention. Alternatively, if Collins' family was already known to Pepys, it might have been Pepys who got him the job aboard Mountagu's ship.

In spite of Dutch seafarers' familiarity with these northern regions, their cartographers' traditional focus had always been on the Narrow Seas down south, so Collins had fewer charts to choose from as a basis for his own large-scale surveys in Scotland. Joan Blaeu in Amsterdam had published a famous Scottish atlas in 1654, based on a series of surveys carried out in the 1590s by the Edinburgh cartographer Timothy Pont. But while these were worthy counterparts to the English maps of Saxton, Norden and Speed south of the border, they do not seem to have impressed Collins in the same way.

There was another source, however. The Scots surveyor John Adair, a contemporary of Collins, tasked as we have seen by the Scottish Privy Council to produce a series of land maps and sea charts of Scotland, was producing work of a very superior quality. There are similarities between

some of the surveys produced by Collins and Adair that suggest at least some mutual influence, if not active collaboration. The two men certainly seem to have been surveying some of the same waters at the same time,[17] and the two cartographers had at least two London engravers in common. James Clark engraved Adair's drafts of Holy Island, the Tay Firth, Montrose and Red Head to Aberdeen, as well as Collins' chart of Fowey. James Moxon engraved Adair's big chart of Scotland, his Strathairn map, and Collins' chart of Milford Haven. Two of Adair's and Collins' surveys bear a more than passing resemblance to each other.

The low-lying, windswept islands of Orkney presented Collins with as much of a challenge as the Scillies had done in terms of wind and weather, but the tidal flows in the northern islands were of a different order of magnitude. In his pilotage notes he merely states that 'The tides run very strong amongst them' and draws attention to the numerous arrows on his chart indicating the direction of the incoming flood. The reality was torrential currents that ran through and around the rocks and islands at such a rate that in places the *Monmouth*, even on her best point of sailing, would have been hard pressed to stem the tide, let alone make any headway. But at least the waters were deep, in contrast to the scattered rocks and sandbanks of the Scillies.

The availability of Adair's Orkney survey must have come as welcome news to Collins, whose published observations of magnetic variation at Edinburgh, Aberdeen, Cromarty, Orkney and Shetland, all for the year 1685, suggest that he was trying to cover the ground at his usual hectic pace. We know he got as far as the Firth of Forth in 1683, for his letter to the Commissioners concerning his survey of the Leman and Ower banks was dated from Edinburgh. He must therefore have gone back for another crack at Scotland in 1685. But with the distances involved and the unreliable northern weather, even two seasons hardly seem adequate for the coverage he managed to achieve.

Adair's Orkney manuscript map from 1682,[18] and Collins' Chart R, The Islands of Orkney, don't at first sight seem to have much to do with each other. Many of the spellings are different and the scales disagree. Adair

drew the main island of Pomona* 20 miles across, not specifying what sort of mile he was using, while Collins made it 30 nautical miles. The north–south extent of the main island group, from the south edge of South Ronaldsay to the northernmost rocks of Papa Westray, is about 58 nautical miles on Collins' chart, but just 40 miles on Adair's manuscript. In terms of scale, in both cases Adair wins hands down, especially if his miles were nautical miles. Collins' problem here arises from his latitude scale, which is graduated wrongly. It pinpoints the correct latitude for Kirkwall, near the centre of the chart, but then gets progressively less accurate towards the north and south because its degrees are too small. Since a latitude scale is also a distance scale – 1 mile equalling one minute – this throws out his distances.

But there are also persuasive similarities between the two surveys, particularly in the overall layout of the islands. Both place Stroma near the middle of Pentland Firth, whereas in fact it lies much closer to the Scottish mainland. In both renditions the island of Hoy is too thin, while South Ronaldsay is too fat. And both charts are orientated west-up, with the right-hand edge to the north. They look like close relations.

Who copied whom is hard to say. Collins had more to gain, as he had compelling reasons to want to save time. Just as in the Scillies, where the Godolphin military map provided him with a serviceable basic outline, Adair's land survey of the islands would have allowed Collins to concentrate on the hydrography, which was more than usually challenging in these tide-beset waters. His chart offers well over one hundred soundings, each needing to be plumbed with the lead and its position pinpointed by taking bearings of the shore, with due calculation for the height of the tide. For each tidal arrow, fifteen in all, he would have had to anchor on the incoming tide and take a bearing along the yacht's cable to establish the direction of flow.

Using Adair's draft would have also given Collins time to investigate in more detail the key Orkney harbours of Kirkwall Bay, Deer Sound and Cairston, which, along with some carefully drawn coastal profiles, are to be found on Chart S, just over the page in the *Pilot*. He used their detail and

accuracy to improve the corresponding areas of his main chart, which contrast markedly with the sketchier nature of Adair's manuscript.

Adair's survey of the Firth of Forth also seems closely related to Collins' chart. The River Forth winds eastwards through Stirling, the old capital of the Scottish kings, past Inverkeithing and Queensferry and down to Leith, Edinburgh's port town, before opening out into the North Sea with Midlothian on the south bank and the Kingdom of Fife to the north. In expanse it is much the same size as the outer Thames Estuary, but instead of the dismal mudflats of Kent and Essex, it is bounded north and south by solid Scottish Carboniferous rock. Adair's Firth of Forth draft was one that the Scotsman was able to see through to engraving and publication, although the atlas in which it appears, *Description of the Sea Coasts and Islands of Scotland*, did not appear until 1703, so Collins was probably only familiar with it in manuscript form. This is one of Adair's 'hydrographicall mappes'[19] with rhumb lines and soundings, intended for the maritime market. Once again both the Scot and the Englishman appear to be marching more or less in step.

Adair is reckoned to be the first surveyor in Scotland to have used triangulation,[20] that laborious process of setting up a baseline on shore from which to measure angles and calculate distances, which Collins so often found he did not have time for. But it gave results. Adair's manuscript chart of the Firth of Forth could be used for coastal pilotage today with little complaint. Of course it has inaccuracies – it makes the Firth slightly wider than it is in reality, while its north–south alignment of Fife Ness with Belhaven on the opposite shore is about 5° off, and the bearings from the shore to Inchkeith island are out by about 10 degrees – but these are all minor errors, and Collins makes them too.[†] Neither cartographer's latitudes quite agree with each other, but those on Collins' chart err by no more than 3 miles and usually by much less. The overall coastal outlines of both charts remain eminently useable.

While Collins and Adair may have worked together at least on their Firth of Forth and Orkney Isles charts, the nature of any collaboration between the harried Englishman and the gifted Scots surveyor is mostly

founded on supposition. It might simply have been a case of Collins borrowing Adair's manuscript drafts. The *Pilot* offers no clues.

Of his association with another Scottish surveyor, however, there is ample evidence. Chart P, detailing the approaches to the ports of Dundee, Aberdeen, and Montrose, is not only dedicated to 'the Magistrates of the Citty of Aberdeene' but also clearly credited: 'The Sea Coast from Fiffnesse to Montros was surveyd by Mr Mar, an ingenious marriner of Dundee.'

John Marr was a well-known local hydrographer, a burgess of the city, a member of the Fraternity of Seamen and Masters of Dundee, and the author of a pilot book to the area, Scotland's first. Collins clearly found this useful – in places the *Pilot*'s text also borrows from Marr, which Collins acknowledges. One of Marr's manuscript charts survives, but we know there were others because he had a deal with at least one Dutch chart publisher. His draft of the entrance to the River Tay and the approaches to Dundee is reckoned to date from about 1666,[21] and Collins either updated it himself or acquired an updated copy, for it shows the new leading lights erected on Buddon Ness to guide ships in between the Abertay and Gaa Sands.[22]

Morale buoyed by having saved so much time courtesy of Messrs Adair and Marr, Collins set about his survey of the northerly Moray Firth with determination. Chart Q, as it became, dedicated to Lord Viscount Torbat,[*] dated 1689 and beautifully engraved by Herman Moll, is one of the most visually pleasing in the entire *Pilot*, and also one of the most accomplished. It is arranged west-up, the complicated coastlines of Beauly Firth, Cromarty Firth and Tarbet Bay trending diagonally down the chart from left to right.

This looks like one chart for which Collins did manage, at least some of the time, to haul the delicate surveying equipment out of the yacht and onto the heather-clad hillsides, set out a trigonometrical baseline with his chains, and take some good sun sights with the 5ft quadrant. Across the 44-mile

north–south extent of the chart, the latitudes of prominent headlands and features are generally accurate to within a mile or a mile and a half. His distances, too, are reliable – from Tarbat Ness to Kessock is about 26.5 miles, and Collins makes it just over 27 – while the overall trend of that stretch of coastline is within a couple of degrees of the corresponding bearing on a modern chart. Sandbanks and channels in the rivers are sounded copiously, with depths in the more marginal areas marked in half-fathoms. Miniature anchors welcome chilled and windblown mariners into these sheltered, deep-water havens. 'The shore bold and steep and no manner of Danger going in or out,' he remarks of Cromarty in the *Pilot*'s notes. 'This Harbour is able to contain the Navy Royal' – which, in due course, it would. Of the more involved approach to Inverness, he advises: 'Keep close to the West shore till you come to Chanry Point,[†] which is a low sandy point, and there it is very narrow.' Further upriver, a mile from a ruined citadel, lies the bar, 'on which is but Fifteen foot at Low water; so that if your ship draw above fifteen Foot Water, you must stay for a tide.' Once inside, the anchorage has 10–15 fathoms.

As a work of scientific hydrography, Chart Q ranks alongside the best efforts of its time. No prior map or chart of the area offers such accuracy. It is so good, in fact, that the presence of that talented and generally more thorough surveyor, John Adair, in the same area as Collins and at about the same time, might lead to an assumption that this was another instance where Collins was given access to an Adair draft, which has since been lost. This would be an unworthy suspicion. We can see that Collins' Chart Q is his own work – not because of its excellence, but because of its errors. It comes close to perfection, but falls just short.

For example, the southern coastline of the Firth runs eastward at an angle about 10° greater than it should be, which has the effect of making the Firth itself a couple of miles too wide. This would not be too troublesome for the inbound navigator, and of course Adair committed the same sin in his manuscript draft of the Firth of Forth. But with Collins it also seems characteristic. He was always pressed for time, and this is exactly the sort of error encouraged by haste, as if he persuaded himself on that particular day

that he didn’t need to set up the theodolite on shore, and could make do instead with a compass bearing taken on board.

The other mistake is less obvious at first. The angle of the Sutherland shore is rendered correctly between Durnoch Point and Helmsdale, right at the eastern edge of the chart, but the distance between the village and the point is too great by about 6 miles. This is certainly not the sort of problem you would expect to find on a map by John Adair. The magnitude of the error seems bizarre until you imagine the circumstances with which Collins was coping. Having set himself up on shore to establish the positions of the principal headlands, bays and promontories in relation to each other, he was then reduced to taking notes on flapping scraps of paper from the *Monmouth*’s deck, or from the longboat, in pencil and probably in the rain, in order to fill in the coastal detail. It was simply quicker to do it from the sea. Starting at the south-western end of this northern shoreline, he seems to have conflated Dunrobin Castle, home of the mighty Sutherlands, with Dunrobin Point, which is nearly 2 miles further up the coast. From there his error was compounded as he tried to reconcile the distances between the tiny rivers, minuscule hamlets and anonymous headlands of this sparsely populated coast, until by the time he got to Helmsdale he was several headlands out. He put the village of Brora where he should have put Lothbeg, and he put Lothbeg where he should have put Helmsdale. The rocky shore, river mouth and old castle that he assumed to be Helmsdale was probably the rocky shore, river mouth and old castle at Berriedale. Against the high land behind them neither place would have been particularly conspicuous from offshore, especially not through the Scottish weather.

Even so, Chart Q remains a valuable and effective navigation aid for those seeking a safe passage through the off-lying rocks and shallows, and into the sheltered harbours of Cromarty, Dornoch or Inverness. The errors do not diminish its usefulness. They are, though, the kind of mistakes that would be made by a hydrographer in a hurry, as Collins invariably was.

Like most of his cartographic contemporaries, Collins had a problematic relationship with latitude. Samuel Pepys was famously told by Trinity House that all existing charts seemed to place the Scilly Isles 10 miles north of their true position.[23] Land maps did not generally take any notice of the islands – they are low lying, and barely visible from Land's End – but maritime charts obviously had to, and the worthy Brethren were right. Their exact latitude was always up for debate, even after Trinity House built a much-needed lighthouse on the island of St Agnes in 1680. As an Elder Brother of Trinity House, and its sometime Master, Pepys probably had numerous conversations on this very subject with some very learned men.

It started with Waghenaer's sixteenth-century chart of the area, which not only mangled the southern Cornish coast misshapenly but also placed the Scilly Isles well north of the latitude of the Lizard's southern tip, when in fact the northerly islands in the group sit more or less exactly on the same parallel as the Lizard, at 49° 57.5'N. A hundred years later chart-makers in Holland, England and France were still following Waghenaer's lead. In 1676 John Seller's textbook *Practical Navigation, or an Introduction to the Whole Art*, put them at 50° 07'N – nearly 10 miles too far north.

Then Collins himself, by now an elected Younger Brother of Trinity House, came back with his survey of the islands, and he had also placed them too far north, by about 8.5 miles. If this error had been repeated on his other charts, it could be deduced that he was using a consistently faulty instrument, or reproducing the same error in his calculations each time. But it isn't that simple. His errors vary from chart to chart. On Collins' Chart 19, the Scillies are indeed more than 8 miles too far north, but the northerly error for the tip of the Lizard, on the same chart, is just 2 miles.

As we have seen, there were fifteen charts with latitude scales in the original edition of the *Pilot*. On none of them are the latitudes entirely correct, but some show impressive instances of accuracy. Off the coast of Wales, the islands of Skomer and Bardsey lie some 65 nautical miles apart,

and Collins' Cardigan Bay chart, number 26, which covers the coastline of Wales from Milford Haven to Anglesey, pinpoints both their latitudes perfectly. And yet on the same chart, the sand-strewn southern entrance to the Menai Strait is placed 4 miles too far north. As Bardsey and Skomer are blessed with reasonably sheltered, deep-water anchorages offering protection from the prevailing westerlies, it seems possible that at both of these conspicuous outlying islands Collins took the opportunity to haul his 5ft quadrant ashore, set it up on solid ground, and attempt an accurate sun sight. The approaches to the Menai Straits, by contrast, are far less hospitable. Collins either attempted a sun sight from on board, or simply made an educated guess at their latitude.

It is a similar story on Chart B, covering the North Sea from the Straits of Dover to the Firth of Forth, in which the latitudes of Spurn Head and Tynemouth Castle are delineated exactly, and the town of Berwick is placed only a mile or so too far north. He might have had Trinity House to thank for that, but these were also places where Collins' yacht could be anchored safely or even brought alongside, and the quadrant manhandled ashore. His latitudes of the exposed headlands of Dungeness and North Foreland, meanwhile, are out by 6 and 7 miles. In the Firths of Forth and Moray, as we have seen, his latitudes are commendable, and on Chart C, which ranges from Northumberland all the way north to Shetland, Peterhead's latitude is correct, while Duncansby Head is 10 miles adrift. It is surely no coincidence that Peterhead offered the *Monmouth* a sheltered harbour, while Duncansby Head is a 200ft cliff that plunges straight into the sea, guarded by jagged pinnacles of old red sandstone.

In Orkney, the disparities range from a 14-mile southerly error in the latitude of Stroma to a 10-mile northerly error for the northern tip of North Ronaldsay. But with Kirkwall, the islands' capital, Collins hit the bullseye. Since these waters were known for their powerful tides as well as their wild weather, anchoring was a risky prospect, and Collins might have felt that only when properly moored fore and aft in Kirkwall harbour could he leave the yacht while he went ashore. Other sun sights would just have to be taken on the wing.

Of course, Collins did himself and the *Pilot* no favours in electing, more often than not, to leave his heavy quadrant safely stowed in its crate rather than ferry it ashore, hire teams of horses, and set it on its stand atop various prominent headlands, as he probably imagined he would. When he used it, the evidence shows that he could get good results. But had he tried to do so all around the coast, he would have probably needed three times as long to achieve the survey coverage that he did, and his *Pilot* would probably not exist.

The latitude issue was by no means unique to Collins. It was universal, as John Seller's *Practical Navigation* illustrates. The book first appeared in 1669, and its table of commonly used latitudes and longitudes spans the entire known world, using data gleaned from numerous sources. Their accuracy is certainly variable, and Seller himself probably wondered how reliable some of them were. They were corrected in each new edition as new information became available.

It is tempting to assume that land-based surveyors had it easier than those struggling with sun sights on a tilting deck, until one considers the state of British roads in the seventeenth century. However, having arrived at a town, or a headland, or a hilltop, surely it ought to have been relatively straightforward for the land surveyor to set up a quadrant on firm ground and obtain a reliable latitude. But it was not. When it came to latitudes, Collins' contemporaries in the map-making world often fared no better than he did. One of Pepys' favoured candidates to undertake the survey, John Adams, never did manage to complete his new map of England and Wales, with its 12-mile trigonometrical baseline in Somerset, but his 6ft-square original from 1677, revised and improved in 1692, was nevertheless a milestone in British cartography. It was drawn on a new, hybrid map projection,[24] had both latitude and longitude scales, and its accompanying gazetteer listed no fewer than twenty-four thousand places. It was designed to look as if pure scientific rigour had flowed straight from the engraver's burin into the plate, and to underline the point, its cartouche and ancillary text were in Latin.

And yet, in a comparison of the latitudes of some of the principal features on Collins' charts with their counterparts on Adams' magnificent map, honours are about even. As we know, whether by luck or judgement, Collins' latitudes for Tynemouth and Spurn Head, and the islands of Bardsey and Skokholm, are right on the button. Adams' latitudes for these places show a northerly error of 2–8 miles. Collins misplaces both Dungeness and Ireland's Eye, the rocky islet off Dublin, by 7 miles; Adams fixes their latitudes exactly. Collins places the Lizard 2 miles too far north; Adams errs by more than 12.

Scotland lay outside the coverage of Adams' map, but not beyond the reach of another equally renowned cartographic contemporary, Robert Morden, who was an innovative publisher best known today for his novel, playing-card size English county maps, issued in 1676 and sold in packs of fifty-two. While Collins was in London hard at work on the production of his *Pilot*, Morden was similarly engaged with a series of county maps for a forthcoming English-language edition of William Camden's monumental *Britannia*, a compendious 1,100-page history, geography and gazetteer of the British Isles. The previous edition of this huge volume, published in Latin in 1607, used maps from Saxton and Speed. Morden's brief was to update their maps by incorporating information from any new surveys that had come to light and by sending his drafts out to the local landowners for checking. The publisher was confident that the maps that resulted were 'by much the fairest and most correct of any that have yet appeared'. And yet accurate latitudes proved just as elusive for Morden as they did for Collins and Adams. Maybe even more so: although most of Morden's errors are in single figures, by the time he gets to Scotland he is often 20 or 30 miles adrift.

Put simply, latitude was a problem. For navigators and surveyors alike, obtaining an accurate latitude with seventeenth-century instruments was difficult. And no one knew who was right. Collins' efforts were no worse than the efforts of even his most able and scientific contemporaries, and were often somewhat better.

On some of the *Pilot*'s charts the latitude issue takes a puzzling turn: in early versions the inscriptions 'sea latitude' and 'land latitude' appear in the margins. To be clear, there is no 'sea latitude' or 'land latitude', only latitude, north or south of the equator, as Collins certainly knew. But consider Chart 26, for example, Cardigan Bay, a very pleasing rendition of the eastern Irish Sea with the coastline of Wales from Milford Haven to Anglesey along the bottom, and a gallery of five seaward views arranged along the upper margin. In its early state the western latitude scale, across the top of the chart, was marked 'Sea Latitude', while the corresponding eastern scale, at the bottom, said 'Land Latitude'. This bottom scale shows some impressive accuracy, as we have seen, in the latitudes of Skomer and Bardsey. But the top scale disagrees with it – by around 74 nautical miles – and was erased for later printings of the chart.

Number 19 was another chart which in its earliest state bore these annotations, the scales on each side disagreeing with each other by about 15 minutes, or nautical miles.[25] Chart 29 also has mismatched latitude scales, and a ghostly trace of the word 'land' in its lower margin. Since all of Collins' charts are plane charts, drawn on a rectilinear grid of equal squares, the latitude scales on each side of the chart should correspond with each other exactly. On this one – a small-scale view of the eastern Irish Sea from northern Wales to southern Scotland, including the Isle of Man – they disagree, also by about 15 minutes. The error was spotted, and initially addressed by erasing the scale on the upper edge, before it was erroneously, and inexplicably, reinserted for a later printing.[26]

Even more peculiar is Chart 30. A close-up, large-scale survey of the Rivers Dee and Mersey, it extends from their sandy estuary up to the city of Chester. It has just the one latitude scale, along the western margin – with a northerly error of 3 miles or so – and on the two earliest printed versions this was labelled first 'sea' and then 'land', before the offending words were scrubbed out altogether. Chart N, the Firth of Forth, and Chart R, The

Orkney Isles, also originally had ‘sea’ and ‘land’ and latitude scales that disagreed with each other by about 15 minutes, all of which were corrected for later editions of the *Pilot*.[27]

No explanation for this oddness has so far come to light. There was no standard binding scheme for the first edition of the *Pilot*, but most copies seem to have had forty-seven charts and three pages of coastal views. Manuscript versions of twenty-four of the charts have survived, and these are held in the archive of the UK Hydrographic Office. They include six of the seven charts in the *Pilot* that have eccentric or mismatched latitude scales, but they offer no clues to the puzzle. The manuscripts of Charts 19 and 30 bear no trace of the ‘Sea latitude’ and ‘Land latitude’ annotations seen in early printed versions. The Chart 26 manuscript draft does have mismatched and error-prone scales – albeit with different errors to those seen in the State 1 charts – but it lacks the incriminating ‘Sea’ or ‘Land’ that had to be erased from the margins in later printed editions. Neither are these found in the hand-drawn drafts of Chart N, or Chart 29.

While the reasoning behind these strange ‘land’ and ‘sea’ latitudes seems destined to remain a mystery, the consistent 15-minute discrepancy between the latitude scales on several of these early state charts has given rise to an ingenious theory that although Collins was the proud possessor of a ‘newfangled’ Davis quadrant, as seen in his invoice to the Admiralty, he did not know how to use it.[28] For taking the altitude of the sun, the theory suggests, he was more accustomed to using a cross-staff.

The theory has its genesis in some scribbled calculations found on one of the endpapers of Collins’ second journal. They record two simultaneous sun sights, seemingly taken for comparison by Collins and an unknown assistant, in Yarmouth roads at noon on 28 May 1683. One is recorded as ‘by the Davis’ – presumably a Davis quadrant – and the other as ‘by the Land’, which for the purposes of the theory is assumed to be a cross-staff. The two readings differ by 13 arcminutes. The diameter of the sun measured from Earth is 32 arcminutes, about half a degree, so the discrepancy is roughly the difference between the sun’s edge and its centre. Since the shadow cast on the Davis quadrant’s horizon vane by the top edge

of the shadow vane would effectively emanate from the edge of the sun rather than its centre, it was customary, as John Seller's *Practical Navigation* explained, 'to subtract 16 min or somewhat less, from the Sun's Altitude, or add it to the Zenith Distance (for the semi-diameter of the sun)'.

The user of the cross-staff, on the other hand, was required to face the dazzling orb, and sight with the top of the cross-vane across its diameter. As Seller remarked, 'tis usual to take a piece of Red Glass to defend the Sight from the Lustre of the Sun', and he recommended mounting the tinted glass in brass, so it could 'be put upon the end of any of the Crosses, as occasion requires'.

According to the theory, the 13-arcminute difference between the two sightings indicates that Collins did not correct for the radius of the sun when using the Davis quadrant, and in repeatedly failing to make this correction during the survey, he had been introducing an error of approximately 15 minutes into all of his latitudes. The hasty calculation in the journal endpapers purportedly represents his dawning realisation, off Yarmouth in 1683, that he had been doing it wrong. However, why he then chose to carry on doing it wrong for the rest of the survey, and chose to apply both corrected and uncorrected latitudes to some of the charts, labelling them 'sea' and 'land', the theory does not make clear. In attempting to account for the 15-mile differences in four of the 'land latitude' and 'sea latitude' charts, the theory also does not consider the 74-mile discrepancy between the two scales on Chart 26, nor the multifarious inconsistencies sprinkled among Collins' latitudes on his other charts.

In any case, it is highly unlikely that Collins did not understand how to use a Davis quadrant. It was hardly new technology, it was not especially complicated, and it was more accurate than the ancient cross-staff or the common backstaff. He had, after all, sailed extensively as both master's mate and master with Sir John Narbrough, who was an avowed devotee of the Davis. And as a quality instrument, Collins' expensive new Davis quadrant probably had a scale inscribed on its 60° arc to correct for the sun's radius.[29] And while the cross-staff was still in use in Collins' day, if Collins had wanted a back-up instrument in case his Davis broke or was

dropped over the side, as a Hydrographer to the King he was more likely to have taken a backstaff. As Seller said of the venerable cross-staff, ‘This instrument is of some antiquity in navigation.’

As for those scribbled sums in the back of the journal, there is a more prosaic explanation. If Collins’ assistant in Yarmouth roads had been using a basic geometric quadrant – a flat brass or wooden quarter-circle with a plumb bob on a string, the type which Collins’ contemporary, the mathematician and Trinity House examiner John Colson, referred to as ‘ye Com[m]on Land Quadrant’[30] – then the notes ‘by the Davis’ and ‘by the Land’ would make more sense. For it could be that Collins was simply demonstrating to his subordinate, as a good ship’s captain would, the differences between the two instruments, and the superiority of the Davis over his assistant’s more basic instrument.

In his demonstration he probably didn’t dwell too much on the fact that whatever instrument a navigator used, measuring the height of the sun from a moving deck was difficult, and very far from an exact science. He really should have hauled that 5ft quadrant ashore more often.

Professor Coolie Verner’s monograph in the journal of the Map Collector’s Circle in 1969[31] remains one of very few serious studies of Greenvile Collins and the *Pilot*.* His ‘carto-bibliographical analysis’ takes up the entire fifty-six pages of the publication and deals with each chart and its various editions with an admirable appearance of thoroughness. The content of each cartouche is transcribed carefully, with detailed descriptions of their designs and embellishments. The scales are measured and translated into metric units, and the signatures of the engravers, if any, are duly acknowledged. Verner considers all the various editions of the Pilot, including a French version, and supplies notes on the additional charts that accumulated down the decades in later editions of the *Pilot* as subsequent surveys from other hydrographers became available.

The impression of comprehensiveness is complete. But although Verner examined many individual examples of Collins' charts, and looked at fourteen different bound copies of the *Pilot*, there are evidently things which he either did not know, or did not notice, or regarded as beyond the scope of his study. He makes no mention, for example, of the inscriptions 'Sea Latitude' and 'Land Latitude', which for anyone paying attention would be hard to miss, so we can assume Verner never encountered these charts in this state. There are eccentricities in the latitudes of the St George's Channel chart which seem to have passed him by, and neither did he spot the divergent latitudes on Chart 29, and in the manuscript of Chart 26. If he did, he didn't think to mention them. As a carto-bibliographer rather than a navigator, he does not seem to have been particularly interested in latitude.

But he does mention one latitude scale – one that is not there. Chart 20 is Collins' large-scale chart of the Isles of Scilly. Verner may not have noticed the corrections in later editions to various rocks in the top-right corner, nor the addition of some new rocks and the sorry little note 'Sr Clously lost'[§§§] in the bottom left, to commemorate – long after Collins' time – the disastrous loss of four ships under Cloudesley Shovell, who was by then an admiral. But Verner did spot something else. The chart is laid out with north at the top, and two columns in the margins down each side headed 'D' for degrees and 'M' for minutes. The columns have gradations one minute apart that correspond with the scale of miles. But the numbers they once contained have been rubbed out on the plate.

Verner wrote that a State 1 version of the Scillies chart was first published in 1689, with its latitudes in place. By the time the *Pilot* as a whole was published in 1693, he says, they had been erased. We have to take his word for it, because no one else seems to have seen this State 1 chart. There isn't an example of it among his papers in the library of the University of British Columbia, and no subsequent researcher seems to have been able to find one in any other library, archive, or collection anywhere in the world. One does wonder whether Verner simply assumed

the existence of an early version, having seen signs that earlier engraving had been rubbed out.

A closer inspection might have led him to a different conclusion, for the professor seems not to have noticed the sole surviving digit in the erased latitude scales: a lone figure ‘1’ in the ‘M’ column at the top left of the chart. On good early impressions, for example the charts in the 1693 copies of the *Pilot* held by London’s Guildhall Library and the British Library, it is also possible to make out traces of another number next to it, which also looks like a 1. The figure was 11 minutes.

The faint remnant of the latitude gradation under this number corresponds with its equally faint counterpart on the opposite margin, and a line drawn between them runs through the northern tips of the islands of Tresco and Bryher, and through the middle of St Martin. The same line transferred to Chart 19, which has intact scales, equates to a latitude of about 50° 06’N – north of the islands’ actual latitude by just about the distance Pepys was wont to complain of.

Verner’s assertion has led to speculation over the years that the latitude figures on Chart 20 were erased when they were discovered to be wrong.* If that were so, their error would have been the same as the error on Chart 19 – whose latitudes were not erased – and the partially erased number in the margin would be 6, not 11. Perhaps a more persuasive explanation for these erased latitudes than the assumed existence of a pre-publication, State 1 edition of Chart 20, is that the plate was second-hand, or repurposed, and needed some old figures rubbed out before it could be used. It is perhaps significant that the only other chart in the *Pilot* which has the ‘D’ and the ‘M’ above the latitude columns is Chart 19, which suggests that these two plates were being worked on, or had at least been prepared, by the same engraver at the same time.

We will come to another possible explanation for these erased figures. It is one which originates not with Collins trying to get a sun sight through gaps in the cloud on the *Merlin*’s tilting deck, but in the sweat, toil and barely controlled chaos of London’s printing district.

When a copy of *Great Britain*'s *Coasting Pilot* was listed in a recent auction, *The Sunday Times* headline was: 'Atlas blamed for sea disaster goes on sale'.[32]

Collins' missing and inconsistent latitudes have led to a belief that he was somehow to blame for the Scillies naval disaster of 1707, when four men-of-war ran onto rocks in the south of the islands and more than 1,300 people were drowned. The officer in charge was Sir Cloudesley Shovell, who was then aged 56 and the navy's most senior admiral. It was a traumatic event both for the navy and the country, and led indirectly to the Longitude Act of 1714. It is imagined that Chart 20's latitudes must have been rubbed out when the catastrophe revealed them to be wrong, but of course they had been rubbed out long before then. In any case Collins' latitude values for the Scillies were there for all to see on Chart 19, as well as on the two large-scale charts of the English Channel that were included in the first edition of the *Pilot*, so one might expect those to have been rubbed out, too, if they were felt to be responsible. Collins' latitudes had nothing to do with the disaster.

It is certainly true that the *Association*, a nearly new ninety-gun second rate, along with the seventy-gun *Eagle*, the fourth-rate *Romney* and the *Firebrand* fireship, were lost because of their navigators' problems with latitude. Such errors were commonplace, but they were only fatal on this occasion due to poor leadership and appalling decision-making. Shovell was not a fool, but he was a fighting admiral – dynamic, brave and impetuous, which are attributes seldom associated with safety at sea. Ill-luck also played a part. If his ships had been sailing just half a mile south of their track, they would have escaped with nothing worse than the sort of bad scare recounted by Sir John Narbrough after his close call aboard the *Fairfax* in 1673 – an episode that Shovell ought to have had imprinted on his memory, for he was there too.

Shovell's twenty-one-strong fleet was three weeks out of Gibraltar and inbound for the English Channel. The weather had been fairly thick for most of the voyage, but not without opportunities to take sun sights – one officer logged fifteen observations during the trip. So they knew their latitude approximately – or thought they did. Some forty-four logbooks survived the disaster, and these show that over the course of the voyage the latitudes derived from sun sights by the fleet's navigators disagreed with each other by an average of more than 25 miles, while latitudes calculated by dead reckoning differed by an average of more than 70 miles. Masters and captains in the fleet would have known of these discrepancies. To share one's workings with a colleague was simply sound seamanship. Aboard just one ship, the ninety-gun *Saint George*, latitude estimates among its many officers disagreed by no less than 111 miles.

Estimates of longitude were understood to be even less reliable, and with good reason – here the logbooks disagree by 2 degrees or more, at a latitude where 1° of longitude is about 40 nautical miles. To compound the navigators' difficulties, there was the essential unreliability of their compasses – when 145 of these instruments were called in from the fleet for checking after the disaster, only three were found to actually work.[33] As for magnetic variation, it would have increased by 3 degrees west during the course of the voyage north, but not one of the forty-four surviving logbooks so much as mentions it.[34]

On 21 October the fleet took soundings, which revealed depths of between 90 and 140 fathoms. This put them well out in the offing, not yet in an area covered by any of the *Pilot*'s charts.

It was a situation in which what they didn't know heavily outweighed what they did. And yet the admiral had seemingly learned nothing from that alarmingly close call with Narbrough aboard the *Fairfax* back in 1673, when he was a mere master's mate. Urged along by a stiff breeze from the south-west, Shovell's fleet sailed blithely onwards through the night, heading east-north-east. At four o'clock the following afternoon, an hour before sunset and with visibility already poor, Shovell had the fleet heave-to, take more soundings, and confer. Two hours later he gave the order and

on they sailed, east by north, into the darkness. He must have thought they were already safely in the Channel, clear of the islands. At eight o'clock they struck.

A careful navigator would have been looking through Collins' pilotage notes as soon as the fleet came into soundings. Doubtless there were plenty of careful navigators in the fleet, but the admiral outranked them.

Collins offered clear instructions in the *Pilot*: 'Directions for coming into the Channel between England and France, called the English Channel.' In a long and thorough exposition, he concerns himself largely with helping the inbound navigator avoid coming to grief on the Scillies. He writes about the abnormal set of the tide, influenced by a current that makes it seem to run northwards for nine hours and southward for only three. This is the so-called 'Rennell Current', offered to the Royal Society as an explanation for the disaster by James Rennell in 1793 – although with no reference to Collins' advice a century earlier.

Collins lauds the usefulness of the new St Agnes lighthouse:

> … a most excellent good Light, and may be seen six and seven Leagues off. Before this Light-House was erected, there was not a Winter but there were some Ships cast away: but since the erecting of it, there hath not a ship been lost, but by Ignorance.

He details the qualities of the seabed all around the seaward side of the islands:

> For five, six, and seven Leagues to the Southward of Scilly, you will have from 50 to 60 Fathom water, fine white sand, with some red and black amongst it, and sometimes some small shells and pieces of shells, and at other times white Sand only.

He even offers advice on the care of the ship's compass during a long sea voyage, to ensure it is giving accurate readings.

And crucially, he writes: ‘Keep in the Latitude of forty-nine degrees thirty minutes, or forty-nine Degrees thirty-five Minutes, or forty-nine Degrees forty Minutes, till you have from sixty to fifty-five Fathom Water.’

Collins knew his readers. Here he painted for them a reassuring picture of a safe corridor into the Channel, 10 miles wide, well south of the islands, which could be followed confidently until the leadsman was calling depths of 55–60 fathoms. In these generous margins we can hear the voice of experience. He knew how navigational errors and uncertainty would accumulate during a long voyage. His readers knew that, too, and he took care to give them nothing more than the sound, practical advice that was immediately applicable to their situation.

> You may keep away East in that Latitude, according as you have Wind and Weather, and in that Depth. But when you have sailed about fifteen or Twenty leagues from sixty to fifty-five or fifty-two fathom, then if the weather be clear you may steer northerly for to make the Land.

The latitudes on Collins’ charts were not the cause of the Scillies disaster. If a navigator has no idea of his own latitude, and no landmarks in sight, latitudes on a chart are simply not relevant. If Shovell really had a copy of the *Pilot* on board, he not only failed to read Collins’ sailing directions, but chose not to listen to anyone who had. His understanding of his fleet’s position was vague at best, and he knew it. The advice offered by his old Mediterranean colleague, in clear, 14-point Roman type, could hardly have been more compelling.

The seamanlike thing for the admiral to do was heave-to until daylight and pay constant attention to the depth – just as Collins had done when making that perfect landfall aboard the *Plymouth* on her way back from the Mediterranean in 1679, under Narbrough’s approving eye. What Shovell actually did was trust to luck, and sail his ships on into the unknown.

Robert Morden's *Britannia* project was a huge and time-consuming undertaking. He used Speed's county maps as his starting point, introducing improvements where he could, and some of those improvements came from Collins. His map of Cornwall, for example, appears to owe plenty to Collins' surveys of Fowey and Falmouth. His Chichester, Langstone and Portsmouth harbours in the Hampshire map are great advances on Speed's, and follow closely the coastal outlines in Collins' Isle of Wight chart, even down to the offshore sandbanks. Elsewhere one can trace Morden's debt to Collins in his treatment of the Scilly Isles, and of the Menai Straits in his map of Anglesey.

In turn, the naval hydrographer benefitted from his association with the county man. Collins' remark to Pepys that 'our sea-coasts were better laid down by Speed than they are in our Waggoner' was an acknowledgement that some of Speed's maps are astonishingly good, and it may have been Morden who first drew Collins' attention to their quality. We have seen that Collins was not averse to using earlier surveys or printed charts and maps, and it is difficult to imagine a surveyor who liked to work as quickly as he did not taking Speed's superlative outline of the coast of Wales, for example, as a starting point for his own.

Collins' *Pilot* was published in 1693, and Morden's vast new *Britannia* in 1695. The printer who was engaged on both books was the same man – Greenvile's cousin, Freeman Collins. So there were undoubtedly periods while the work was going on when both Morden and Collins, and their engravers, were busily engaged on their print projects not just at the same time, but in the same premises. A special binding of Collins' *Great Britain*'s *Coasting Pilot* ordered by Samuel Pepys includes two maps made by Morden.[35] The naval secretary probably saw them when visiting the printer to look at Collins' work.

This cross-pollination helps to explain one of the *Pilot*'s mysteries.

Seventeenth-century cartographers had a variety of map projections to choose from, according to the task in hand. Even Mercator didn't use the projection that bears his name for the land maps he produced, for on those the spatial relationships between places, and the representation of the relative sizes of counties or countries, are more useful than the ability to draw a course to steer as a straight line.

While Collins' charts are all straightforward plane charts, drawn on a lat:long graticule of equal squares, Morden was a mathematical map-maker like Adams, and used a stereographic projection with converging longitudes. Although at the scale of his county maps this convergence is barely measurable, their inward lean is obvious. Also obvious is the way in which the lines of latitude, which have to cross the longitudes at right angles, take on a slant. Technically, the lines of latitude are curved, but at the scales Morden used they can essentially be regarded as straight lines. The lines of latitude and longitude themselves are not engraved on Morden's maps, but each one has scales on all four edges: minutes of time along the upper edge, and degrees and minutes of longitude along the bottom, both emanating from his prime meridian at London Bridge. The latitude scales run up the sides. Because of the slant, they don't at first appear to correspond with each other.

The fact that plates for both Morden and Collins were being engraved in London at the same time, and in the same busy workshops by some of the same people, raises an interesting possibility regarding the mismatched latitudes on some of Collins' charts.

Chart 29 in the *Pilot*, the Irish Sea with the Isle of Man, is one which initially had latitude scales that did not appear to correspond. Drawing in the latitude lines on an uncorrected version of this chart, to join the figures on one side with their opposite numbers, produces a slant of about 10 degrees. Do the same with the latitudes on Morden's map of the same area, and the slant is the same: 10 degrees. It is as if the same engraver worked on both, and inscribed the latitude scales for Collins' chart before he realised that it did not use the same projection as Morden's map.*

Now consider the *Pilot*'s Chart 19, Land's End and the Scilly Isles, which originally sported mismatched latitude scales, before they were adjusted (and the words 'Land' and 'Sea' erased). In reality, the northerly island of St Martin lies due west of the tip of the Lizard peninsula, on a bearing of 270 degrees. This bearing line passes south of Land's End at a distance of about 5 miles. On the chart, as we have seen, Collins seemed to place the islands too far north by about 8.5 miles. But drawing in the bearing between St Martin and the Lizard, and extending the line to each side of the chart, produces a slant of 10 degrees. The line also passes 5 miles south of Land's End, confirming that in the essential geometry of the relationship between the islands and the two headlands, Collins' survey was pretty accurate. Now imagine rotating the chart anticlockwise by 10 degrees, beneath the graticule, using the Lizard as a pivot point, until the bearing line is horizontal. St Martin is now, correctly, on the same latitude as the Lizard, and still positioned correctly in relation to Land's End. And the islands are only 2 miles too far north, rather than 8.5.

So, like his chart of the Irish Sea, Collins' chart of Land's End and the Scillies might originally have been engraved on the wrong projection, with its lines of latitude and coastal outlines on a 10° slant. When the latitude scales were altered, the slant remained. This would mean that Chart 19's latitudes for the Scillies were more accurate before they were corrected. All that really needed to be done was to rotate the chart's compass rose clockwise by 10 degrees.

Chart 20, the close-up of the Scillies themselves, was probably engraved after the problems with Chart 19 were noticed, because there is no discernible slant: in relation to each other and to true north, Collins' orientation of the islands and the channels between them is accurate. But there is still a question as to its original projection. It is intriguing to note that the 10° slanted bearing line that runs from the Lizard and through St Martin hits Chart 19's corrected western latitude scale at about 50° 11'. This matches the ghostly '11' in the erased Minute scale on Chart 20, at a latitude that runs through St Martin, which might be a coincidence. But it

might also be showing us the engraver's initial, incorrect, assumption about the chart's projection.

When he persuaded the king to commission the survey, Collins created for himself a niche outside of the strict confines of naval discipline and hierarchy, the hydrographical equivalent of the independent cruises so beloved of frigate captains hoping to get rich with prize money. But he was still by no means his own boss. The king's word was law, and in 1684 he was told to stop what he was doing and report to London.[36] Two gentlemen by the name of Keck and Heiton were felt to be abusing their patent rights to a section of the foreshore of the river, and disagreements had arisen. The Duke of York had got involved, and so had the king, along with the Navy Board, the Admiralty, Trinity House and the Worshipful Company of Shipwrights, and after some debate it was decided that a survey was needed of any encroachments into the river that might be prejudicial to navigation. Collins was called in. The situation does not seem to have been resolved satisfactorily, except perhaps to the satisfaction of Messrs Keck and Heiton, whose activities appear to have been in no way curtailed by all the fuss.

Collins' survey covered both banks of the Thames, from London Bridge down to Cuckold's Point in Rotherhithe, at the very large scale of around 50in to the mile, and in an extraordinary amount of detail. Every set of steps down to the water is shown, every mooring chain, every dock, boatyard, slipway, pier, quay and causeway. Each riverside business or enterprise is marked with the name of its proprietor, from Mr Chumley's brewhouse just downstream of the bridge to Mr Graves' gun wharf at Limehouse. In the mud, the low-water mark is indicated by a dotted line, and the mound of silt deposited on the inside of the bend before the Globe Stairs is labelled: 'The great Banck of Oaze which 9 foot hig[h] above low-water marke.' The accompanying notes by the officials in charge of the investigation judged

whether the waterside structures were ‘old’ or ‘new’, and which of the encroachments were ‘prejudicial’ or ‘very prejudicial’ to navigation.
Collins’ original draft is lost, but two superb contemporary copies have survived, one on six sheets[37] and one on seven,[38] which were hand-drawn by John Thornton.[39] Their exemplary draftsmanship testifies to Thornton’s long training in London’s ‘Thames school’ of manuscript chart-makers, and shows a mastery of pen and ink that Collins would have struggled to achieve.

Although of a comparatively short stretch of foreshore, with its exceptional degree of detail the Thames encroachments survey would have been a time-consuming project. As there are few other records in the archives to tell us what else Collins was up to during 1684, it is impossible to say how long it took him, where he went next, or precisely when he was able to resume his great survey of the British coast. In the *Pilot* he notes his measurements of compass variation in Edinburgh, Aberdeen, Cromarty, Orkney and Shetland ‘in the Year 1685’, and his surveys in the northern part of the Irish Sea, including the Isle of Man and the southern shore of the Galloway peninsula, are thought to date to the 1686 season.[40] But during this period it is not clear exactly where he was and when.

Similar mystery surrounds his activities in early 1688, when he spent another significant period of time on a superbly detailed survey of the River Medway, in northern Kent. This was the scene of the English navy’s greatest humiliation, the famous Dutch raid in 1667. By 1688 the Dutch were once again looking threatening, and King James II was feeling far from secure on his throne. Collins’ survey of the river was not for the *Pilot*, and it seems probable that it was the king’s anxiety about Dutch intentions that led him to call for this new, large-scale chart of the river and its defences.

Whatever its origins, it is another superlative piece of work, on a large scale of just over 3in to the mile. Forts are drawn in red, with the number of their guns. Creeks and swatchways are delineated minutely, and the low-tide mark is picked out by a dotted line. The streets of Chatham and Rochester are rendered carefully, along with the bridge and the naval

dockyard. A pointing hand in the corner invites the viewer to ‘Note that the Depth of water is set downe at low water at Spring Tydes, the Black ffigures are Fathams and the Red Feete. Surveyed by G Collins Anno 1688’.

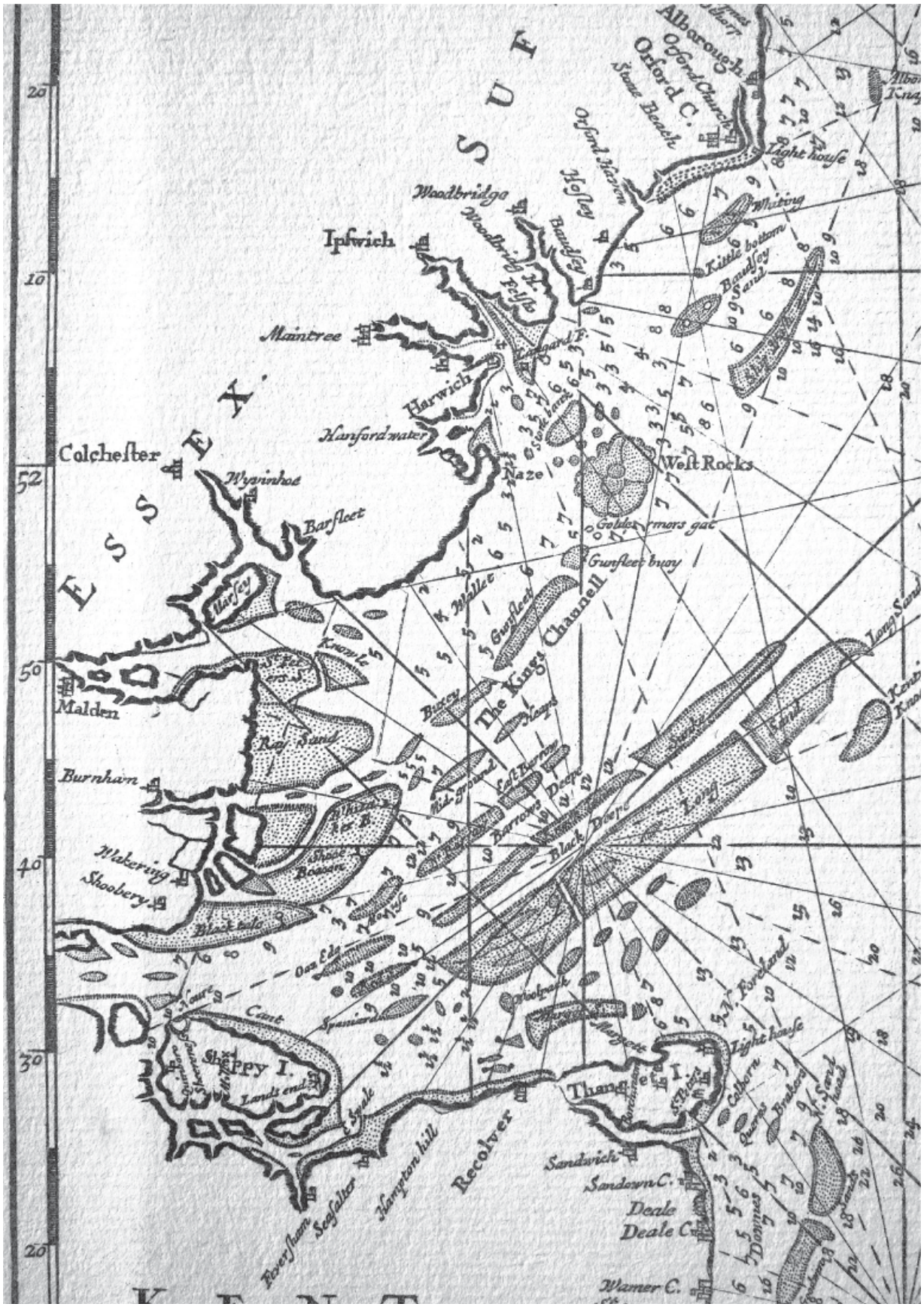
Once again Collins’ original draft does not appear to have survived, and the hand-drawn copy in the archives is the work of a very accomplished draftsman indeed – perhaps John Thornton again.[41]

Collins’ great survey of the coast was hard and unrelenting, but it occasionally offered up episodes of absurdity. On 7 September 1683, on his way back south from his first survey cruise to Scotland, Collins was startled to look up and see a battle fleet on the horizon, beneath a cloud of billowing sail, bearing down on his diminutive *Monmouth*. The little yacht was well out to sea off Flamborough Head, between the rugged Yorkshire coast and the shelving, submerged slopes of the Dogger Bank, so there was nowhere to hide, and no prospect of escape. But remembering the steely example of Sir John Berry during the *Leopard* cruise three summers before, when a lone pair of mid-size English warships faced the prospect of annihilation at the hands of a fleet of Ottoman war galleys, Collins realised there was nothing to be done but brazen it out. He may even have cleared the decks for action.

As the twenty-strong flotilla approached, all of them men-of-war, Collins identified their Dutch ensigns and ordered the king’s colours, a huge flag the length of the longboat, hoisted from the yacht’s ensign staff. The two countries were not, last time he heard, at war. It did the trick. In fact, it did more than that. According to an account sent to the king, the Dutchmen ‘on appearance of his Majesty’s colours paid all the respect that could be expected’. The Dutch admiral struck his colours, as did the ships of his vice and rear admirals. The flagship’s gunports bellowed with smoke and flame as the admiral saluted the solitary English yacht with nine guns, followed by seven guns apiece from the vice and rear admirals, and five guns from

each of the other seventeen ships in the flotilla, so that from the distant shore it must have sounded like the opening broadsides of a fleet action. Then ‘the Admiral on the poop drunk the King of England’s health and so parted’, as did Collins, ‘having received all the due respects as from one of his Majesty’s ships’.[42]

That was the official version of the story, which made its way to London via the king’s people in Newcastle. When Collins stopped over in Hull soon afterwards, he would no doubt have told a different tale. Over a few beers in the White Harte, the local brethren from nearby Trinity House would have roared as he described the Dutchman gazing down at the little English vessel from his floating fortress as the cannon smoke cleared, before solemnly raising a glass of genever. For with this exaggerated display of respect, the admiral undoubtedly had his tongue firmly in his cheek, remembering how touchy the English could be when it came to saluting. There had been an infamous incident twelve years before, when another Dutch salute to another English yacht, the *Merlin*, was deemed insufficiently respectful. Affecting outrage, the king used it as a pretext for starting the Third Dutch War.[43]


SUFFOLK
ESSEX
KENT
Albarough
Orford C.
Orford Church
Stone Beach
Orford Haven
Holley
Light house
Whiting
Kittle bottom
Bawdsey Sand
Woodbridge
Woodbridge Ferry
Bawdsey
Ipswich
Maintree
Harwich
Hanford water
Colchester
Wyvinhoe
Barfleet
Mersey
Naze
Stoke barne
Wolf Rocks
Golden Ermers gat
Gunfleet buoy
Gunfleet
The Kings Channell
Long Sand
Kentish Knock
Malden
Burnham
Maldering
Shoobery
Black tale
Raj Sand
Buxey
Knoll
Wil ground
Barrows
Deep
Black Deep
Long
Sticks
Sand
Oaze Eds
Spaniards
Grisloock
Margate
N. Foreland
Light house
Sheppy I.
Lands end
Thanet I.
Sandwich
Sandown C.
Deale
Deale C.
Recolver
Harryton hill
Seasalter
Reversham
Warner C.
Dominos
Quends
Brabard
N. Sark head
Calburn
Stone
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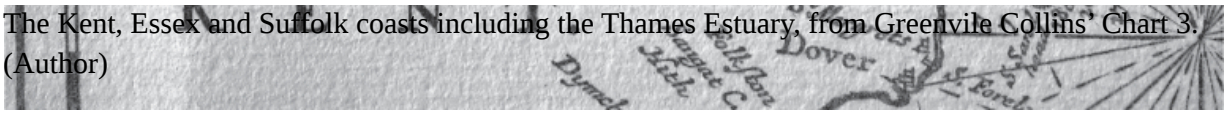

The Kent, Essex and Suffolk coasts including the Thames Estuary, from Greenvile Collins' Chart 3. (Author)

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* In the first edition. Subsequent editions of the *Pilot* had both text sections bound in at the front, and compressed significantly.
* Happisburgh.
* Collins makes the distance from Foulness to the middle of the Ower Bank 27 nautical miles, which is a couple of miles further than on a modern chart. But sandbanks move, so he wasn't necessarily wrong.
* King's Lynn.
† In the text of the *Pilot*, Collins writes: 'Wells, Burnham, Lynn and Boston, I have not survey'd, being hindred by this present War.' This was William III's war in Ireland of 1689–91, in which Collins was involved at the same time as trying to oversee the production of the *Pilot*. We come to this in Chapter 7.
‡ The Farne Islands.
§ Bridlington.
¶ Auburn.
* Mainland.
† Adair's 1703 printed version addresses these issues.
* Tarbat.
† Chanonry Point.
* Others include Florence Dyer's essay on the second Collins journal in the *Mariner*'s *Mirror* in 1928, and Stuart Mountfield's article about Collins and Pepys from 1970, also in the *Mariner*'s *Mirror*. More recently, in 2015, the historian J.D. Davies posted a piece about the 1680 journal on his website (jddavies.com). A few PhD theses and other studies can be found online, as can Dr Adrian Webb's discoveries of Collins' origins. But until Paul Hughes' book came out in 2022, which also drew heavily on Dr Webb's research, pickings for Collins aficionados were slim.

§§§ In the bootlegged French edition of the *Pilot*, this becomes a new rock: ‘Clously L’Ost’.

* Another theory is that the scale on the chart was in statute miles, which did not match the nautical miles of the latitude gradations. It was then deemed easier to erase the latitude figures than to correct the scale. [Everard.]

* With its remarkably true alignment of the Mull of Galloway, Peel, and the north-eastern coast of Anglesey, it is possible that Chart 29’s latitude scales were matched correctly, and that it was therefore the compass rose, and the rhumb lines radiating from it, that were engraved with an erroneous 10° slant. If so, while the chart’s scale is out by a good 10 per cent, its longitudinal accuracy would be almost supernatural for a seventeenth-century survey (compare it with the St George’s Channel chart). So it doesn’t seem likely. Besides, a compass rose on a slant other than 90 or 180 degrees, not necessitated by the shape of the survey (e.g. the River Avon and, arguably, Kinsale), would be unique in Collins’ *Pilot*.

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6

Conspiracy and Crisis

I could wish I had more force if the enimy be so strong as I am told, tho' I believe we are as good a winter Squadron as ever England put to sea at this time of year, and as nothing shall be wanting on my part for your Majestie's service so upon the best enquiry I can make I apprehend nothing but a readiness in all the Commanders to do their duty.

Baron Dartmouth, Admiral of the Fleet, to King James, 24 October 1688

Summer, 1688: Greenvile Collins wrapped up his work on the River Medway's defences for King James, and handed over his notes and sketch maps. He had still not finished his great survey of the British coast, but it would just have to wait. There was a flap on. Queen Mary had given birth to a healthy son, and the king's hydrographer was about to find himself back on active service.

An heir to the throne was big news. James II had been king since the death of his brother, Charles II, three years before. Unlike Charles, who as king was a closet Catholic and only converted on his deathbed, in James England had an openly Catholic king for the first time since the Reformation. Now there was a Catholic heir. It had taken a while. His first wife, Anne Hyde, came from a notable Royalist family and met James when they were in exile in the Netherlands during Cromwell's rule.* They married in 1660 once her first pregnancy became too obvious to ignore. But although two of her daughters, Mary and Anne, were destined to become Queens of England, none of her six other children survived beyond the age of 3. She died in 1671, aged 34.

Anne Stuart, née Hyde, had converted to Catholicism as an adult, and James' conversion in 1673 soon became common knowledge. After the Popish Plot added fuel to the fire under England's always-simmering anti-Catholic hysteria, Parliament's move to exclude James from the succession did nothing to calm the national mood, which was volatile and paranoid. The populace genuinely feared an international Catholic conspiracy, which would see them enslaved by the French while the country's treasure was shipped off to Rome.[1] Wealthy landowning families who had done well out of Henry VIII's break up of the monastic estates didn't want to hand it all back to the Church. Charles was able to weather this Exclusion Crisis, and the monarchy emerged the stronger for it, but it took years.[2]

As Charles aged with no legitimate heir, the prospect of his brother inheriting the throne became increasingly likely. James had paid no heed at all to anybody's finer feelings when choosing his second wife, Mary of Modena, who had been brought up a Catholic in Italy and arrived in London as his bride in 1673. She was well educated, pretty, and 15. He was

41. The unfortunate young woman endured a harrowing series of ten pregnancies over the next eleven years as James tried to secure a male heir, and with each miscarriage, stillbirth and infant death, Parliament's apprehensions about a Catholic succession gradually subsided. A further miscarriage in May 1684 seemed to signal a hiatus.

For Parliament, a Catholic king was seen as something that could be endured temporarily, since James was not a young man and his daughters from his first marriage, and increasingly probable heirs, were both being brought up as Protestants. Indeed, Mary, the eldest, had already been packed off to Holland to marry her cousin, James' nephew, William of Orange.[†] But with the birth of Prince James Francis Edward Stuart in 1688, a male heir suddenly trumped her claim to the throne, and a Catholic dynasty looked a certainty.

Unless something could be done.

In holding to his principles, James was not trying to be awkward. He simply found himself in an impossible situation. As king, he was both head of the Church of England, and a member of the Scottish Kirk's general assembly. In England, therefore, he was required to believe in bishops and reject Calvinism, while in Scotland, he had to do the opposite.[3] As a follower of the Church of Rome, his distaste for this domestic fudge was hardly surprising, for his religious beliefs were sincere and deeply held.[4] Charles had felt the same way, although he was a much more astute juggler of political hot potatoes, first playing the Dutch and French against each other before securing from Louis XIV, under the secret Treaty of Dover, an annual pension for himself of £230,000. It wasn't quite a secret: when Pepys got wind of it, he reckoned it to be 'a thing that will make the Parliament and kingdom mad, and will turn to our ruin'.[5]

Meanwhile, it was little wonder that popular faith in the joint establishment of Church and state was getting a little shaky, paving the way for constitutional reform. It was to come sooner than James could have imagined, as the atmosphere in the halls of power became steadily more fevered while the royal pregnancy progressed. On the other side of the North Sea, William of Orange, the principal *statholder* and effective ruler of

the Dutch Republic, was seriously considering an invasion of England. It was nothing personal, and neither was he motivated by religious principle, but he was becoming more and more concerned about the French. France was the pre-eminent military superpower on the Continent, but second to both the Dutch and the English in terms of naval strength. William knew – as did the English – that a French invasion of England was never far from Louis XIV's mind, and if that happened, the combined force of the French and English navies would pose an existential threat to the Republic. William had to get his hands on the Royal Navy before Louis did.

The Royal Navy wasn't, on the face of it, a particularly potent force. Apart from its Mediterranean operations, it had been on a peacetime footing since Charles had signed the Treaty of Westminster fourteen years before, to extricate his cash-strapped kingdom from its war alongside France against the Dutch. Of the thirty new ships approved by Parliament in 1677, only five second rates and six third rates had so far been commissioned,[6] and along with many of His Majesty's older ships, most of them were laid up 'in ordinary', undermanned, unrigged, weedy bottomed, and by no means ready for sea.

But as disquieting rumours of invasion by the Dutch began to make their way across the North Sea, officials at Whitehall and the Admiralty began to stir. Collins was commanded to survey the River Medway. At the end of April, Pepys issued instructions to speed up the refitting of ships, and sent a party of special commissioners down to Chatham to see to the security of the fleet in case of a Dutch raid. King James at this point was not especially concerned, but to mollify his anxious officials he paid a visit to Chatham in the company of Sir Roger Strickland and the Duke of Grafton, and ordered the refit of two more third rates and three fourth rates. The towering first and second rates, each mounting eighty to a hundred guns and requiring a crew of 600 or more to sail and fight them, were to remain laid up. The service was short of men and money. Pepys, meanwhile, travelled on down the Medway to inspect the fort at Gillingham and found it far from battle-ready.

The king's misreading of the country's mood bordered on insouciance. He had not been popular since his religious conversion when still Duke of York, and although he was known as a brave and effective naval commander, he was held by some to have been responsible for starting the Second Anglo-Dutch War,[7] with its humiliating Medway raid, and he had also been blamed for the navy's failure to beat the Dutch at the Battle of Solebay.[8]

But his overconfidence can perhaps be forgiven. As both duke and king, he had survived plenty of scrapes. With the imposition of the Test Acts in 1673, which faced him with the choice of resigning his post as Lord High Admiral or denying his faith, he chose resignation – but was still able to influence naval policy from behind the scenes. Since then, the Exclusion Crisis had failed to dislodge him, and soon after that the Rye House Plot, to assassinate both James and the king at their palace in Newmarket, had fizzled out. In 1685, the year of James' coronation, the Duke of Monmouth, Charles' oldest son, sailed from Holland and landed in Lyme Regis to try to stir up a rebellion in the strongly Royalist and Protestant West Country. It ended in a blood-drenched field in the Somerset Levels, and Monmouth and hundreds of his followers were executed at the infamous Bloody Assizes. A parallel rising in Scotland, led by the Earl of Argyll, also failed. Maybe these turns of fortune reinforced James' beliefs in his divine right to rule, and he had started to think he was invulnerable.

On the other hand, his efforts to soften the stance of the Protestant establishment towards Catholicism had not gone well. In the first year of his reign, he prorogued Parliament when it declined to repeal the Test Acts, which excluded Catholics from public office. An attempt to appoint a pro-Catholic master to one of the Oxford colleges was rebuffed by its fellows, in politely legal terms.

It was the Declaration of Indulgence that finally blew up in his face. Undeterred by the failure of a similar declaration made by his brother fifteen years earlier, James issued his edict for religious toleration and liberty of conscience on 27 April 1688 – freedoms under the law which would have extended not just to Catholics but to the various dissenting

Protestant sects as well. He ordered the English clergy to endorse the declaration by reading it to their congregations in church, on two successive Sundays. The bishops didn't exactly refuse, but when they petitioned the king to withdraw the order they were told that they would be charged with sedition and would have to post bail. This time they did refuse, effectively backing the Crown into a corner and giving James no choice but to lock them up like criminals.[9] Supportive crowds lined the banks of the Thames from Whitehall to London Bridge as the seven bishops were taken by barge to the Tower of London,[10] and at their trial on 29 June, much to everyone's surprise, they were acquitted. James' authority was holed below the waterline.

On the same day as this humiliation, Admiral Arthur Herbert of the king's navy boarded a boat in Kent disguised as a common seaman, and sailed to the Netherlands on a secret mission. Herbert had commanded the so-called 'Tangerines' in the Mediterranean, and he carried a letter signed by seven prominent opponents of King James, inviting William of Orange to come to England to safeguard the Protestant faith. These 'immortal seven' comprised a naval officer, an army officer, three earls, a viscount and a bishop, and the letter merely formalised proceedings that had long been in train.[11] It meant William's plan to invade could now claim to have a legal footing.

While all this was going on, James and Mary's baby son was born on 10 June. On the 13th, Greenvile Collins was summoned by Samuel Pepys and ordered post haste to the south coast, to take charge of Portsmouth's patrol craft, or scout boats, guarding the harbour and its dockyard. He was to use the old *Merlin* yacht as his headquarters. The next morning, he heaved his trunk aboard a coach from the Cross Keys in Gracechurch Street, jolted down New Fish Street past The Pillar, as Robert Hooke's newly built monument to the Great Fire was known,[†] and clattered over London Bridge.

His formal warrant from the king would follow as soon as it had been written out.

Collins' journey took him down dusty lanes through the village of Wandsworth and across Putney Heath to Kingston, before crossing the winding River Wey at Guildford and recrossing it a few miles further on at Godalming. In the wooded hills of Surrey, their oaks in the full leaf of early summer, he passed through Milford, skirted the edge of the huge natural amphitheatre at Hindhead known as the Bottom, and continued down the Portsmouth Road to Petersfield, where he put up for the night in a coaching inn. He arrived in Portsmouth next day, and on 16 June presented himself to the resident commissioner of Portsmouth dockyard, the naval veteran Sir Richard Beach.

Collins had commanded the *Merlin* during the first two seasons of the survey, covering the south coast in 1681 and 1682, but as he moved his dunnage aboard, those hectic, busy and optimistic days must have seemed a very long time ago. After a period laid up, the old yacht was in a sorry state. For the first week he had carpenters, caulkers and joiners working on board to make her watertight, while he kept his crew of twenty-six busy chipping rust off the yacht's six diminutive cannon,* exercising with muskets, and running the guns in and out.

As Collins' warrant explained, the guard ships at Portsmouth had been posted away to face the Dutch threat, either to the Thames Estuary or to join Sir Roger Strickland's fleet in the Downs. The absence of these fully armed and fully crewed warships left the navy's remaining assets in Portsmouth harbour vulnerable to accidents and pilfering, and Collins' orders from Sir Richard Beach instructed him to organise night-time patrols using his two scout boats, manned by men from the *Merlin* and commanded in turn by the gunners from the eighteen warships moored 'in ordinary', with their yards and topmasts struck down and just skeleton crews on board. 'You are to take care that noe gunner goes upon that duty twice, before they have all taken their turns,' commanded the admiral.[12] Patrols were to cover the length of the harbour from Hardway, where HMS *Advice* was moored, down to the harbour mouth where the *Young Spragge* lay at anchor under

the guns of the Round Tower. Collins' men should hail each ship as they passed:

> If they find they are not answeared by their proper officer which should be upon the water, or if they see any fire or candle or debauchery in drincking by any officer in their scouting aboard of any shipp, they are to goe on board and to cause the said fire and candle to be put out, and to give mee an account thereof the next morning.

Beach was a formidable character, a staunch royalist who had commanded king's ships since the early 1650s and fought with the French against Cromwell's 'generals at sea', and no officer in his right mind would want to cross him. The scout boats should also pry into the tidal creeks on each side of the harbour, he instructed, 'thereby to discover if any of his Majesty's goods be stolen or embeazeled by any boats from ye ships or yard'.

As the navy laboured to haul itself into some semblance of battle-readiness, refit work at Portsmouth went on around the clock. A succession of frigates and at least one second rate were floated into the graving dock at high water to be scrubbed, and then hauled out again to be rigged and made ready for sea. It was the same story at Chatham, where the shipwright Sir Anthony Deane complained that he was getting about five hours' sleep in twenty-four.[13] Collins gazed up from the *Merlin* as the massive ninety-gun *Coronation* was docked on 17 July, followed closely by the elderly third-rate HMS *York*. By August the dockyard was into its stride, and on Beach's orders he sent ten of the *Merlin*'s crew to assist on shore. The *Nonsuch* and *Richmond*, a pair of diminutive fifth rates, arrived in the harbour to transport troops to Jersey, only to have their orders changed immediately: *Nonsuch* should take her troops to the Downs instead, while *Richmond* would be converted into a sacrificial fireship. So would the *Pearl* – both ships were graved on the same day – and Collins noted that henceforth all of the navy's fifth rates would suffer the same fate. Working double tides,

the dockyard teams turned the *Advice* and *Diamond* third rates around in three days and then turned their attentions to the *Plymouth*, *Dreadnought* and *Warspite*. Collins took the opportunity to have his men heel the *Merlin* at her moorings and give her bottom a scrub, too.

To read Collins' journal of this period you might get the impression that England's story in 1688 was all about the weather. As it turned out this was not far from the truth, although there were other factors in play, with which Collins was to find himself directly involved. But in writing up the fair copy of his journal – after the events that came to be known as the Glorious Revolution, but before anyone could know whether they meant the end of one regime and the beginning of another, or simply the start of another civil war – Collins followed Admiral Beach's orders to the letter:

> You are to keep a journall of all transactions whatsoever that shall happen in the night or day, as likewise of any storms or other accidents which may happen, and the points of the compasse the wind is at each day, with the change of wether, and what else you think fit for the satisfaction of the Principal Officers and Commissrs of his Majs Navy.

At times his journal reads like an incantation. These are the entries for ten days in August, in their entirety:

1. Little wind from ye NW to the W faire wether
2, 3, 4. Little wind Easterly and faire wether
5. Little wind from ye NNE to ye NNW
6, 7. The wind from the NNW to the SE faire wether
8. Little wind from the SE to the SW. Faire wether
9. The wind from ye SW to the NW faire wether
10. Ditto

For the weather was the only safe subject in a journal that would be inspected by the king's officers and possibly by the king himself, whoever he might turn out to be. Portsmouth was just a day's fast ride from London, and in reporting daily to the port commissioner's office Collins heard all the news and gossip from the capital, but paid it no heed – at least not in writing. He would have known that Strickland, in the Downs, had been ordered to send patrols to Orford Ness, on the Suffolk coast, and to the other side of the Goodwin Sands, to look for any signs of a threat. That Louis XIV was on the move against the Germans, and the Dutch states were uniting behind William of Orange. That the French had offered King James a fleet to help fight off an invasion, but James had turned it down. And that Sir John Berry and Sir William Booth, two of the navy's most senior commanders, had had such a furious row over a purser that Pepys recommended they both be suspended from duty. In the middle of August came word that William's ninety-strong fleet was almost ready to sail.[14]

Collins was naturally concerned with all of this, both personally and professionally, just as in his earlier journals he had been interested in the news of the Popish Plot, cheered by the arrival of a store ship full of pork and beans, or fascinated by the sight of a passing walrus. But his 1688 journal records no gossip about promotions, no remarks about religion, no rumours fresh from the mill. On 1 July he noted dutifully, in accordance with a fleet order from Pepys: 'Fired seven guns being a day of thanksgiving for the birth of the Prince of Wales.' And on 21 July, next to a telltale pointing finger in the margin, he allowed himself a personal reflection: 'Little wind and faire wether, sent twenty men to help the careening the Coronation. This day received the news of the death of that worthy and ingenious seaman Sr John Narbrough, who dyed in the West Indies.'

A seaman of Collins' experience could easily picture the difficulties of mounting an invasion of England from across the North Sea. To extract a battle fleet from the shallows on the Dutch side, escorting a miscellany of cumbersome transports packed with soldiers, horses, weapons and provisions, and then somehow to thread them through the maze of

sandbanks off Essex or Suffolk to land an army on the English side, would be a formidable challenge even on an undefended coast. It would have been hard for Collins and his fellow officers to believe that William could seriously be contemplating the prospect, because it seemed utterly mad. And the alternative, sailing down-Channel to the deeper and less tide-beset harbours of the south and west, might involve a running battle with English warships, which could be equally fatal to William's ambitions.

So the weather would be critical, but the fate of the expedition would also depend a good deal on William's fleet evading the English navy – or in other words, on luck. There were those in the Royal Navy determined to tilt the balance of fortune William's way.

The king could have used that 'worthy and ingenious seaman' Sir John Narbrough. Intelligent, humane, decisive and courageous, Collins' mentor had been perhaps the finest naval officer of his generation. In the event, the man James chose to command his fleet for the defence of the realm was a different kind of officer: George Legge, the first Baron Dartmouth. Where Narbrough was the very model of the modern 'tarpaulin' officer championed by Samuel Pepys – men from middling backgrounds, properly trained for command at sea – Dartmouth was an example of its antithesis. He was wealthy, entitled, and born to rule: the type of gentleman officer that Charles and his brother liked to put in command of king's ships, but which Pepys felt should best be kept on shore where they couldn't cause too much harm.

But Pepys did quite like Dartmouth as a man. They had been on a voyage together, to Tangier. It was one of the Secretary to the Admiralty's few forays on the sea, and the same could almost be said of Dartmouth himself, who, although an admiral, could hardly claim to have had a long or distinguished naval career. He was the son of a Royalist colonel, educated at Westminster and Cambridge, and during the Four Days Battle in 1666 he

served aboard HMS *Dreadnought*, commanded by his cousin, Admiral Sir Edward Spragge. Young Legge obviously didn't disgrace himself, because the next year, aged 20, he was given command of the fifth-rate HMS *Pembroke*, which five weeks later was involved in a collision and sank. Dartmouth was promoted sideways and sent ashore as Groom of the Chamber to James, Duke of York, not venturing to sea again for five years, when he was appointed to command the sixty-gun *Fairfax* – the very ship which had sunk the little *Pembroke*. He fought at the Solebay bloodbath in 1672, and as commander of the *Royal Katherine* also took part in the three furious battles of the following summer. He acquitted himself well – his crew captured a Dutch fifty-gun ship, but left it to its fate as it was sinking, and in all three engagements his own ship was badly knocked about, sustaining numerous casualties.

But in his journal of those days, he seems rather detached from events, as if he had been a spectator. For much of it he simply copied the navigation notes of his master or lieutenant without, apparently, making any attempt to understand them: 'We steered away NNE and NbE and N and NbW and NNW and NWbN and NW, and then anchored in 12 fathom water, the North Foreland bearing WSW,' he recorded on 21 May. After one engagement, he wrote: 'The place where we fought was very dangerous, for we feared more the losing of our ships upon the sands than we did losing our ships and lives in fight with the enemy.' And while he could describe the entire course of a major fleet engagement in a single paragraph, afterwards he would record the reprovisioning of his ship in painstaking detail, copying from his purser's dockets the last piece of pork, bushel of peas and pound of butter, even noting the name of the victualler and that of her master:

> Saturday the 30th we took in 160 bags of bread, and pork 2,800 pieces, the vessel's name the Elizabeth of Dover, Guy Hudson master. Also 59 bushels of peas received the same day out of the Unity of Margate, Robert Leister master, butter 1,638 pound, cheese 2,095 pound.

> Sunday the 31st. Received out of the Speedwell, Mr Constable master, flour 2,012 pound, currants 322 pound.[15]

Here we see a man who would have been happy to work behind a desk. It was as if, after the stresses of battle, he wanted to retreat in his mind to a place of safety.

For which he can hardly be blamed. After the bloody summer of 1673 Dartmouth came ashore again, and as the years passed, he must have assumed his seafaring days were over – indeed, perhaps hoped so, because it did seem that every time he went to sea, something awful happened, whether it was being sunk by his own side or being shot at by thousands of furious Dutchmen. He knew his duty, so he made himself useful, serving in Parliament, as Governor of Portsmouth, and as Master-General of the Ordnance for the King. But then one day in the spring of 1682 he was summoned to Court and told that he was to accompany the Duke of York on a voyage to Edinburgh. The king's brother had recently returned from a long exile in the Low Countries, and wishing to keep him out of London, Charles sent him north on official business. While there, the Duke was also to collect his wife Mary, who was pregnant.[16]

Packed with the duke's staff, courtiers and advisers, HMS *Gloucester* set off from the Thames Estuary on 4 May, waved off by the king himself and accompanied by a flotilla of frigates and royal yachts, one of which, the *Katherine*, carried Samuel Pepys as a passenger.[17] The *Gloucester* was a substantial third rate of sixty guns, nearly 30 years old but fairly recently refitted, with a crew of more than 250. After two days at sea, 25 miles off the north Norfolk coast, steering north-north-west on a broad reach at 5.30 in the morning – the sun was well up – she piled into a submerged sandbank at 6 knots and stoved in her bilges.

The tide was rising, which might have been good news if the ship could still swim, but the damage to her timbers was grave. Running at about 1 knot to the south-south-east, the stream carried the *Gloucester* back off the bank and into deeper water, where she settled quickly. The Duke of York dithered, and everyone had to dither with him, prevented by protocol from

taking to the boats before he did. When his strongbox was lowered over the side, his supporters, including Dartmouth,[18] stopped others climbing into the boat, lest it be swamped and his papers lost. The rigging slackened as the ship began to break up, masts teetered, and spars and blocks began to fall on the crowded decks. From the *Katherine*, Samuel Pepys looked on in dismay. Dartmouth must have thought his last hour had come. Hundreds drowned as the ship went down.

Even by the standards of the navy it was a disaster.[*] There was an experienced Scottish pilot on board who knew the route and favoured the well-worn 'Colliers Road' between the coast and the sands. The *Gloucester*'s master would have preferred to stand out to sea, well clear of all hazards, and a couple of captains off the other ships chipped in and put the pilot's nose out of joint by agreeing with their naval colleague. But the Duke of York outranked everybody, and when he overruled the pilot and told him not to tack but stand on and take a middle course, the hapless Scotsman had no choice but to obey. An account written later by the *Gloucester*'s captain, who was none other than Sir John Berry, placed the blame for the disaster firmly on the duke. Dartmouth, no seaman and with no official role on board beyond that of courtier, could do nothing but watch glumly as the crisis played itself out.[†]

The sorry episode did nothing for James' popularity. In contrast to the sentiments expressed in Dryden's 1667 epic *Annus Mirabilis*, honouring the duke's heroism at the Battle of Lowestoft, in London after the *Gloucester* disaster you couldn't move for poets and playwrights cranking out laboured metaphors about the foundering ship of state. But Dartmouth kept his counsel and remained a dutiful servant of the Crown. The following year, 1683, he was summoned before King Charles again and told that he was to be the last governor of Tangier, with the sad duty of evacuating the failed colony and destroying its defences, including the huge stone breakwater, which had been under construction for twenty years and was still not finished. He sailed aboard the third-rate *Henrietta*, commanded once again by Sir John Berry, in company with the *Grafton*.[19] Samuel Pepys went along as Dartmouth's adviser, appointed by the king.

Pepys had stopped writing his famous diary some years before, but he kept a journal of the Tangier trip, and appended to it many pages of notes recording the numerous examples of drunkenness and debauchery that he found in the colony. Admiral Arthur Herbert had taken over from Sir John Narbrough as Mediterranean C-in-C, and Pepys did not like him at all: 'The only man that I do not know to have any one virtue to compound for all his vices.'[20] He felt Herbert was exercising a malign influence on naval morals. He never seemed to go to sea: 'Sir J Wyborne tells me that whereas Narbrough never lay once ashore all the time he was admiral here … Herbert never lay aboard, but on shore in state,' he wrote.[21] There was corruption, too: naval officers were growing rich taking backhanders from the merchant ship captains they escorted into Cádiz, and earning fat commissions for transporting the ship owners' silver – although this was nothing new. Pepys was well aware of the practice. He had heard of enormous sums of more than £2,000 being paid to co-operative captains, including Narbrough.[22]

If Pepys' judging of Herbert's morals seems a little rich coming from a serial sex pest and occasional rapist,[23] he would have insisted that his concern was for the efficiency of the navy, not the immortal soul of the admiral. As for the corruption, Pepys himself had done extremely well out of it, thanks to his seat on the Privy Council's Committee for Tangier.[24]

During the voyage south, Pepys and Dartmouth spent many an evening in conversation. The perspicacious naval administrator was slightly bemused by how little the Master-General of the Ordnance seemed to know about blowing things up,[25] but although he might have been flattered by the way in which the nobleman took him into his confidence,[26] and seemed to approve of him as a courteous and gentlemanly soul, he didn't let his personal feelings cloud his judgement.

In their discussions concerning discipline among the navy's officers, or the lack of it, Dartmouth assured Pepys that he was resolved to take the matter up with the Duke of York on their return, but repeatedly sought the naval secretary's assurance that he would come along with him when he did so, for moral support.[27] The king himself had tasked Dartmouth with

shaking things up while in Tangier, and Pepys clearly expected him to impose some order on the place, but the timorous Baron seemed ill-equipped to do so. He saw personal enemies everywhere. 'Such is the power of interest and fear of making enemies at home that there is not any one thing that he has durst to rectify,' Pepys wrote.[28]

Justifying his own inaction, on more than one occasion Dartmouth confided to Pepys that he was fearful that any attempt he might make to enforce discipline among Herbert's officers would simply cause them to complain to the Admiralty about him, and in any case, since he wasn't going to be in Tangier for very long, there was no point.[29] Two officers were due to be court-martialled for saluting a Spanish ship (under some duress), but in spite of assuring Pepys on the outward voyage of his resolution to do so, Dartmouth let the matter slide.[30] This might have been welcomed by the officers in question, Cloudesley Shovell and Matthew Aylmer, but such laxity was hardly the best way to gain their respect.

For Pepys, the worst instance of the baron's feebleness was the case of a young lieutenant accused of drunkenness and neglect of duty. He was allowed to resign his commission rather than face a court martial, and then given a lift home, all because Dartmouth knew his family: 'My lord Dartmouth out of kindness to his father advises and lets him surrender and takes him home civilly, a passenger on board his own ship.'[31] In Pepys' judgement, Dartmouth was a weak and ineffectual officer, lacking resolution, unhappy with the idea of command, frightened of confrontation and intimidated by rank and connections.

He was not the only one dismayed by Dartmouth's spinelessness. Stiff with his own rectitude, the redoubtable Sir John Berry was not only disgusted by the way certain officers were lining their pockets, but also spoke of his 'dislike and contempt' for the bumbling baron's irresolute behaviour.[32] 'Tis pretty to see how my lord himself can pass anything in a gentleman captain and let it be made a jest,' Pepys wrote. The example of Dartmouth confirmed all of Pepys' opinions about the dangers of gentleman officers:

> Nothing, methinks, can more show the necessity to have all things of discipline and advantage brought under a certainty of rule, without room left to admirals and chief officers, than my observation of the disability even of my lord Dartmouth himself to keep himself upright in his execution of his place.[33]

This was the loyal courtier James wanted as 'Admiral and chief Commander of His Majesty's Ships in the narrow seas for the present expedition'.[34] On 24 September 1688, Rear Admiral Sir Roger Strickland, a Catholic convert, was relieved of his command of the fleet, and Baron Dartmouth was appointed in his place. Strickland became Dartmouth's vice admiral, with Sir John Berry, as rear admiral, his third-in-command.

Dartmouth's flagship was HMS *Resolution*. The irony went unremarked at the time.

Things were moving fast in Whitehall. By the time of Dartmouth's appointment to the fleet, Pepys had already recalled Collins from Portsmouth, ordering him to take a fellow officer up-Channel to the Downs in the *Young Spragge*, a sixth rate so called because she had been Sir Edward Spragge's private yacht. A sweet sailer, the little ship made good time, and less than forty-eight hours after leaving Portsmouth Collins was anchoring in the Downs, well inshore of Strickland's twenty men-of-war and their attendant flotilla of fireships. A hard south-westerly gale followed them in, causing havoc: they struck down yards and topmasts, their anchor dragged, and the *Dover*'s pinnace was sunk on its way back to the ship. Collins had barely received his formal commission as the *Spragge*'s commander, with instructions to head back to Portsmouth, when Pepys countermanded the order. He was to leave the yacht in the Downs, and make haste to London: 'His Majesty having provided some other command for me.'

This was on the evening of 23 September, a Sunday. On Monday morning Collins went ashore, clambered aboard a post horse in Deal and set off on the 55-mile ride towards the capital, through Canterbury and Rochester on the old Roman road, stopping only to change horses and fortify himself at the inns with a lump of bread and a glass of ale. He arrived at Gravesend late that night. It was a blustery season of autumnal English gales, bringing drenching rain in from the Atlantic, and he was not only wet, but exhausted – it was months since he'd been anywhere near a horse, and at 45 he was probably feeling that he was getting a bit old for this sort of thing. After a meal and a few hours of hastily snatched sleep in the inn, at high tide, three in the morning, he caught an open two-man wherry from the Gravesend slipway for the final leg of his journey. It was a choppy, 25-mile row upriver, against the wind, on the incoming flood.

When the boat finally bumped against the steps of the York House watergate, close to Charing Cross, Collins was damp, stiff, sleepless, and thoroughly chilled. He hauled himself out of the stern sheets and into York Buildings,* where Pepys had his apartment and the Admiralty had its offices. It was nine o'clock, or a little before. The naval secretary was waiting for him, and in attendance with Pepys was an anxious Baron Dartmouth, weighted with his grave new responsibilities. 'I waited on Mr Secretary Pepis,' Collins wrote, 'and there met my Lord Dartmouth who his Majty hath made Lord Admiral of his fleete for this present expedition, who did me the Hon to appoint me to be his master in the Resolution.'

Whether it was Sir John Berry, Pepys, the *Resolution*'s captain or even the king who first put the idea into his head – and any one of them could have provided a fulsome recommendation – Dartmouth had convinced himself, or allowed himself to be convinced, that Greenvile Collins was the one man that the king, the country and he himself needed on this most exacting and momentous undertaking. His own rather perilous experiences on board ship had taught him the vital importance of competent, professional and experienced ship's masters. He rated them far more highly than captains. 'My Lord Dartmouth himself observes to me that the whole charge of the ship lies in the master,' Pepys wrote after one of their

conversations, ‘let the captain be what he will.’[35] If Collins was the best master in the navy, then Collins he had to have.

It was irregular. Leaving aside the fact that Collins had been busily engaged in his survey as the king’s hydrographer, he also had his own command, and while Dartmouth promised him a £50 sweetener, he was in effect asking Collins to accept a demotion.[36] But Collins could hardly refuse his duty. And in this redoubtable Westcountryman, Dartmouth beheld an officer of long experience, a Younger Brother of Trinity House, and the architect of the much talked-about survey. This man had fought against the furious Dutch and battled ferocious Algerines. He was a navigator of renown, perhaps the foremost such man in the king’s navy. Had he been aboard the *Gloucester* on that terrible day in 1682, all would no doubt have been well. With Collins as master of the *Resolution*, surely the fleet, the nation, and indeed Dartmouth himself would be in safe hands.

There was no time to lose. The tide was on the turn. Without even a chance to warm himself and dry off in front of the fire, Collins followed the Baron out of Pepys’ apartment, back down the steps and into a waiting barge, which took them across to Dartmouth’s yacht. They set off on the ebb and sailed downriver as far as Erith. Here Dartmouth went ashore to pick up his coach and drive to Chatham, where the *Resolution* was moored. Collins, accompanied by a Lieutenant Wright, continued in the yacht down to Gravesend, where they too would take a coach down to the ship.

But at Gravesend all of Collins’ exertions caught up with him. ‘I was taken with a lameness in all my limbs and was not able to move,’ he confessed to his journal. ‘Which lameness was caused by my riding post and catching cold afterwards by going by water.’ The chill, the damp, and the lack of sleep manifested themselves in a debilitating fever. He was put to bed in the Black Boy, hard by the slipway at the bottom of Gravesend High Street. And there he lay, shivering.

The next day, Wednesday, a doctor was summoned, who recommended stoking up the fire to sweat the fever out. On Thursday a still prostrate Collins received a distinguished visitor:

> My Lord Dartmouth came to Gravesend from Chatham to goe for London, who gave me the Honr of a most kind visset, giving the Doctor a great charge of me, and that he should use all means possible for my recovery, and that I might not want for anything. My lord presented the Doctor with a fee, and gave me ten pounds to beare the charge of my sickness.

Considerate, courteous, and gentlemanly, the baron's behaviour towards Collins was beyond the call of even the most courtly manners for a person of his rank. Given the imminence of the threat from across the North Sea it is also surprising that he did not simply appoint someone else. The nation was in danger and could surely brook no delay, and the navy did, after all, have other ship's masters. But Dartmouth's faith in Collins was absolute. He believed that he simply could not do without him. Collins was Dartmouth's man, and come what may, the war with William would have to wait until his man was well.

Dartmouth had not been idle. He was concentrating his forces and had ordered Strickland's squadron up from the Downs to join him at the Nore, where he was taking on supplies. Pepys was meanwhile drafting the Fighting Instructions, exhorting the admiral to 'endeavour by all hostile means to sink, burn, take and otherwise destroy' the Dutch invaders.

On Friday the doctor sweated his patient again, and Collins, although weak, began to feel a little better. By Saturday he was over the worst: the fever was running its course, and he could sit up in bed. On Monday he tried a short walk. Then on the evening of Tuesday, 2 October, he watched as Dartmouth's yacht dropped her anchor off the Gravesend slipway, with the baron himself on board, and lowered a boat to collect him. 'I went aboard his Lordsp, and at 12 at night anchored at the buoy of the Nower, close by the Resolution.'

In his conversations with Pepys during the Tangier voyage, Dartmouth seemed to be seeing enemies everywhere. But he wasn't completely paranoid. He had a long-standing animosity with the traitorous Admiral Herbert, who having delivered the letter of invitation from the 'immortal seven' to William of Orange, was now the nominal commander of the assembling Dutch invasion fleet. Edward Russell was one of the captains whose corruption at Cádiz had incurred Pepys' displeasure,[37] and as one of the letter's signatories he too was in Holland, helping to plan the invasion. It would be only sensible for Dartmouth to assume that these senior officers had accomplices, who served as their eyes and ears among the English fleet. Other influential figures also didn't see eye-to-eye with Dartmouth, whose instinctive feelings of loyalty to the Crown were not universally shared. One was the Duke of Grafton, who in the face of the invasion threat had expected the king to give him command of the fleet, and was now furious with both the king and the hapless baron.[38] Sir John Berry was another officer whose motivations Dartmouth could not but doubt. He was strongly anti-Catholic and didn't much care who knew. He owned an old monastic estate in Kent and had no intention of handing it back.[39] He had sailed with Dartmouth on both the *Gloucester* and the Tangier voyage and was not especially impressed with the baron as either a seaman or a leader. But Berry was one of the navy's most able officers, and his views proved no impediment to his appointment by the king as Dartmouth's rear admiral.

In fact, the navy as a whole seemed suspiciously relaxed about the prospect of a Protestant coup. There were very few Catholics in the service – just fifteen officers and twenty seamen, according to a 1687 survey, compared with a hundred officers and more than four thousand Catholic soldiers in the army. Many naval officers might have been persuaded by Herbert's 'Letter to all Commanders of Ships and Sea-men', in which he warned that a victory over the Dutch would lead to their enslavement and the death of Protestantism.[40]

Certainly there was a conspicuous lack of urgency ashore. William was even better supplied with spies in both the army and the navy than Samuel Pepys suspected,[41] and in several communications to Dartmouth, who was

down at the Nore on board the *Resolution* trying to obtain supplies for his fleet, Pepys told the admiral how Whitehall Palace was full of naval captains sauntering about instead of getting their ships ready for sea, lamenting ‘the delays that will be made, under one pretence or another in commanders getting their shipps down’.

The *St Albans*, he observed, exasperated, would be ‘more in the way of forwarding, had her Comander taken his leave of the Court’. Two weeks later he was still seeing gentleman captains ‘complaineing that their shipps are not ready, while nothing is wanting towards making them ready but their own attendance on board’.[42] Sir John Berry himself still lacked a ship. His flag captain, Sir John Nevell, was an ally and protégé of Admiral Herbert, which might explain why the *Elizabeth* was remarkably ill-prepared considering the lateness of the hour. ‘Sir John Berry Rear Admiral in ye Elizabeth,’ Collins wrote on 7 October, ‘came out of the Swale and anchored at the Nower, being bound up into the Hope to take in his gunns and provisions.’ This ominous absence of zeal merely added to Dartmouth’s anxieties.

The *Resolution*, Dartmouth’s flagship, was a powerful seventy-gun third rate, 148ft long on her gun deck, with a draught of nearly 17ft at the stern, and a complement of 420 men.[43] She was anchored at the buoy of the Nore, on the south side of the Thames, between Sheerness in Kent and Shoeburyness on the Essex shore, which might be thought an odd place from which to defend England against an invasion from across the southern North Sea. It was too far upriver. The estuaries of Essex and Suffolk all offered themselves as possible landing points, as did the now deserted anchorage of the Downs, not to mention the various deep-water harbours along England’s south coast. Any armchair admiral could have pointed out that concentrating the fleet at the Nore, where water deep enough to float a third rate at low tide was barely 2 miles wide, would be all very well if the

enemy were threatening London or the Medway, but not otherwise. Any east in the wind would make it very difficult for Dartmouth to get his ships out to fight.

England had a senior armchair admiral in the shape of King James himself, who could not resist sticking his oar in. It was James who originally instructed Dartmouth to rendezvous at the Nore, as a convenient place to gather the fleet together from the Thames, the Medway and the Downs.[44] But now it was time to get under way. Pepys had already tried tactfully to induce the admiral to move rather than wait any longer for his supplies, and on 5 October the king weighed in. 'I need not mind you to lose no time to get out from among the sands as fast as you can,' he wrote, and followed up three days later:

> Consider well whether you should lose the opportunity of this westerly wind to get out from amongst the sands or venture to have the Dutch come and find you somewhere near the buoy of the Oaze Edge amongst the sands. For you must expect they will come out and be looking for you with the first easterly wind.[45]

He was right, of course. The wind which would most encourage the Dutch to sail was the same wind that would prevent the English from doing anything about it. For the moment, however, it was blowing hard from the west-south-west and west-north-west, as Collins noted in his journal, and keeping the Dutch in port. At a council of war called by the admiral on board the *Resolution*, Collins learned of various proposed anti-invasion measures, such as removing the navigation buoys marking the Gunfleet and Middle Ground sandbanks, and shifting the leading lights on the approach to Harwich, in the hope of luring the Dutch to destruction on the Ridge Sand. A flotilla of smacks would stand by the Harwich buoys ready to lift them if William's fleet approached.

Collins made a list of the ships in Dartmouth's fleet, and their commanders, noticing several old Mediterranean friends and colleagues

among them, members of the brotherhood of ‘Tangerines’ who were to become key players in the forthcoming drama. As well as Berry there was the dashing Cloudesley Shovell, like Collins a protégé of Narbrough’s. He commanded the *Dover*. Captain Hastings of the *Woolwich* had been first lieutenant on HMS *Assurance* back in 1677, a fourth rate that Collins mentioned frequently in his journal, whether cruising in company or sharing an anchorage. Captain Aylmer of the *Swallow* had been a young midshipman in the Mediterranean in 1677, arriving aboard the *Charles* galley during one of Narbrough’s reshuffles. He may even have been on board for a short while before Collins moved over to the *James*, in which case Collins, as master, had been responsible for supervising Aylmer and his fellow junior officers in navigation and seamanship.

Strickland and Berry’s divisions fielded eleven frigates each, while the admiral’s comprised thirteen. Of the total, eleven were third rates of sixty to seventy guns, although the elderly *York* and *Henrietta* mounted just fifty-two guns apiece. The rest were fourth rates of various vintages, from the familiar old thirty-four-gun *Foresight* in Berry’s squadron to the fifty-gun *St Albans*, whose captain had finally managed not only to tear himself away from Court, but to extract his brand-new ship from Deptford dockyard, no doubt smelling strongly of paint.[46] These thirty-five ships of the line were supported by seventeen fireships.

Dartmouth felt – hoped – that the very existence of his fleet, modest as it was, would dissuade the Dutch from risking an invasion. He also wondered whether William, a cunning adversary, would seek to create a feint with his warships, to engage the English in battle while his troop-laden transports sneaked off to effect a landing elsewhere. On top of all this, winter was coming on, which was not the season for being at sea. The result of his deliberations was that Dartmouth could not decide on a course of action. After the horrors of the *Gloucester*’s sinking, the baron had no great enthusiasm for east coast sandbanks, lurking just below the surface to inflict death and disaster on any ill-conducted ship. He was also keenly aware of the great danger he would put his fleet into if he sailed on this westerly breeze to give battle among the sandbanks off the Dutch coast, which were

no doubt equally treacherous. Losing a battle at sea would mean losing the kingdom: ‘I well know our being beaten may prove a fatal consequence.’[47] To make matters worse, both Pepys and the king were punctilious in their respect for Dartmouth’s rank and position, assuring him that any decision was entirely his to take. It was hopeless. He was paralysed by indecision. If only someone would just tell him what to do.

There were those in the fleet willing to oblige, but they would have to conduct themselves tactfully.

Winds were variable on 13 October. Then, Collins wrote, ‘At night the wind came out at NE’. Any east in the wind could favour the Dutch. The baron could surely procrastinate no longer, but he did. In the morning, he called another council of war, summoning his captains aboard the *Resolution*. Intelligence received suggested that the Dutch were already at sea, with fifty men-of-war and about 250 transports, heading, it was believed, for Harwich or thereabouts. Sir John Berry gave up on the seventy-gun *Elizabeth*, still getting her cannon in at the Hope, and hoisted his flag temporarily in the *Defiance*, sixty-four, as Dartmouth pondered the absence, already, of a powerful third rate.

The wind remained variable, swinging round to the south in the evening, but it was back in the north and north-east by the morning of 15 October, when the English ships finally hauled their anchors out of the Nore mud. They tacked laboriously as far as the Black Tail beacon, 7 miles further down the estuary, and then had to anchor again, as the strong inbound spring tide made further progress impossible. Next day ‘a fresh gale’ set in to the north-north-east, preventing any further movement. Black Tail marked the southern end of the Swin channel, running roughly north-east and barely 2 miles wide at low water, so there was no easy way forward for the English ships. The ebb would help, of course, but it was two days after the new moon: any ship that grounded on a falling spring tide ran the genuine risk of being stuck there for a fortnight.

Unwilling to trust his own judgement, on 17 October Dartmouth called a council of his flag officers, led by William Davies, the *Resolution*’s captain, and the pilots and masters of the three flagships, among whom

Collins was the most senior. The admiral needed their opinion as to the wisdom of getting his unwieldy ships under way in this north-easterly, necessarily downwind, before coming about and trying to zig-zag, tack by tack, up the narrow Swin. Unsurprisingly, nobody thought it was a good idea, least of all Collins: ‘It being very dangerous to turn down a fleet, many of which being great shipps.’

It wasn’t just his own judgement, Dartmouth realised, that he was reluctant to trust. There was a contrary mood in the fleet, and he could sense it. Cloudesley Shovell, who along with Matthew Aylmer had experienced first-hand Dartmouth’s lack of authority and confidence in command down in the Mediterranean, was not the only younger captain who was believed to be in communication with Edward Russell in Holland.[48]

Other worrying reports reached the admiral’s ears. ‘The Duke of Grafton was down here among them a little after my coming, though he would not let me know it,’ Dartmouth wrote to the king.[49] One thing Grafton had learned about during his time in the Mediterranean with Collins and Berry was power – the literal, lethal power jutting from the *Leopard*’s open gunports as they faced down the four Algerian privateers; the latent power of the fearsome Ottoman war galleys, demanding a salute which they did not then deign to return; and even the soft power of diplomacy during that drunken evening with the Tripolitan commander who would not, or could not, climb aboard the frigate for a nightcap, but was nevertheless persuaded to release his captive Irish captain into the care of Sir John.

It was not long before Grafton was given power of his own. Almost as soon as he returned to England aboard the *Leopard*, the young nobleman found himself appointed regimental colonel of the Grenadier Guards, Master of Trinity House, and Vice Admiral of England – effectively commander of the king’s home fleet at the age of 18.[50] He commanded the seventy-gun *Grafton*, took part in the Siege of Luxembourg on the side of

Louis XIV against the Spanish, did a tour as commander of the Mediterranean fleet, and made a name for himself in battle during Monmouth's ill-starred rebellion in 1685, serving under John Churchill, the future Duke of Marlborough. Grafton had served an apprenticeship worthy of a general or a statesman, and had he lived, according to his biographer, he might have outshone Churchill himself.[51]

He never learned to keep a cool head. Duelling was illegal, but he knew his connections would always keep him out of prison: he had already killed two men.[52] Still only 25, the fiery young duke was keen to get in amongst the English fleet, secretly, and signed himself on as a volunteer aboard Captain Hastings' *Woolwich*.[53] It would not have been at all clear to Dartmouth whose side he was on.

Then there was the commander of the *Montague*, Lord Berkeley. The baron described him as 'very pert' – a euphemism for disloyal leanings – and his suspicions proved to be correct.[54] It was well known that the Catholic officer Sir Roger Strickland, his vice admiral, was resented by those who felt he had been unfairly favoured by the king,[55] while Dartmouth's abrasive and opinionated rear admiral, Sir John Berry, one of the most respected officers in the service,[56] had written that damning report blaming James for the *Gloucester*'s loss. Grafton was sometimes rumoured to be conspiring with Sir John,[57] and sometimes with John Churchill,[58] who was also, coincidentally, another survivor of the *Gloucester* disaster. The loyalty of Churchill's younger brother George, captain of the *Newcastle*, was similarly suspect.

Amid such suspicion and uncertainty, the admiral could not say with confidence which of his ships, if any, would follow him into battle against William's fleet. In calling councils of war to seek the opinions of his officers, he could not be sure of the advice they offered, nor why they were offering it: could they simply be advising him to do what William would want him to do? Had they been encouraging him to act too cautiously? Were they playing him for a fool?

Dartmouth was aware, of course, that after their long Mediterranean cruise in the *Leopard* in 1680, Berry, Grafton and Greenvile Collins were

trusted old colleagues. He also knew that his own flag captain, William Davies, was a committed opponent of Catholic oppression, having once been disciplined for bringing Huguenot refugees across to England from France aboard the *Katherine* yacht.[59] As the *Katherine*'s commander, Davies had also witnessed the sinking of the *Gloucester*, and as a professional naval captain that episode was also unlikely to have sweetened his disposition towards King James.

But now Dartmouth discovered a new connection, and with it another potentially worrying alliance: Davies, his flag captain, turned out to be yet another old shipmate of Greenvile Collins, his trusted master. Arriving on board the flagship for the first time, Collins wrote in his journal: 'In the morning went with my Lord aboard the Resolution and there tooke possession and charge of master of the said shipp. Here I found my worthy good friend Capn Wm Davies Capn of the Resolution under my Lord Dartmouth.'

This friendship between Collins and Davies seems to have gone back many years, to HMS *Triumph*, which Collins had joined as master's mate in time for the Battle of Solebay in 1672. After her captain was killed in that ferocious sea fight, her temporary captain, Charles Wylde, was duly succeeded by William Davies as her permanent commander. Davies was an experienced officer not much older than Collins himself, but his naval career had followed a more conventional path. He received his first command within a year of making lieutenant, and fought in the Four Days and St James' Day battles of 1666. At Solebay he commanded the fourth-rate HMS *Mary Rose*. Davies joined *Triumph* in February 1673,[60] and as Collins had not been discharged when the ship paid off the previous October, it seems likely that he was still on board when Davies joined. The comradeship between the two men would have been forged in fire during that summer's three pitched battles against the Dutch, and perhaps it was Davies who gave Collins his step from master's mate to master. They had certainly encountered each other since their *Triumph* days, and as equals, for like Collins, Davies had lately been serving as a yacht captain, based at Deptford.

There is no doubt about the warmth of the language Collins used to mark their reunion on board a fighting ship. Nothing else like it appears in the journals. By comparison, even the death of Narbrough, Collins' great mentor, was recorded in muted terms. As Dartmouth watched these 'worthy good friends' stride across the *Resolution*'s quarterdeck to greet each other, it might have crossed his mind that perhaps he didn't know as much about his ship's master as he ought.

But who else could he trust? Although Collins seemed to know a surprising number of Dartmouth's officers, some of whose loyalties were suspect, the admiral was convinced that he was totally reliant on the master's intimate knowledge of these frightening east coast waters. It might have been Pepys who cemented Dartmouth's unshakeable faith in Collins, by telling him the story of how, after the Mediterranean cruise in the *Leopard*, the ship and her crew were given one last assignment before they were allowed back to Deptford to pay off. As Collins recorded in his journal, which Pepys certainly read, they were ordered to go across from the Downs to Harwich, to help sail a newly launched second rate upriver to Chatham.[61]

The Thames Estuary can present navigational challenges even on a clear summer's day, but it was January, freezing, and foggy. Leaving the anchorage on the morning of Wednesday, 19 January, they crept in their weatherbeaten warship northwards across the estuary and up towards the Essex coast, with no landmarks in sight, entirely reliant on the lead and dead reckoning, tolling the bell as they went, and anchoring when the fog got so thick they couldn't see the forecastle from the quarterdeck. Finally, they 'steard in WNW till we came into 10 fathom water and then anchored being very thick and foggy and noe land to be seen', as Collins noted in his journal. Visibility was zero. To know the depth was useful, but far from definitive – it only told them where they were not. The direction of the tide might suggest a channel, but not which one.

Collins was confident. As the anchor splashed down in the eerie grey stillness, he wrote: 'Balsey[‡] Church boare by Judgmt NNW.' It was Friday, 21 January, the feast of St Agnes. On Saturday morning the fog lifted, and

there was the church, exactly where he said it would be: he had fixed their position by the sound of the evensong bells.[†] This was the man in whom Dartmouth placed his trust.

On 17 October, after the captains and masters in the council of war advised Dartmouth in bald terms not to attempt tacking the fleet up the Swin Channel, they persuaded him instead to anchor his thirty-five ships in a line along 8 miles of open water in the middle of the estuary. At least one historian has suggested that spreading out the fleet so thinly in this way would discourage the captains from plotting together,[62] and that may indeed have been part of the plan's appeal to the admiral, but it had little else to recommend it. It gave his fleet no room to manoeuvre, and could only hope to influence events if the Dutch were committed to a direct attack on London. The captains and masters had perhaps been working on their admiral's weakness. The language in Collins' journal speaks of his passivity: 'It was then resolved to ride with the fleet between the buoy of the Oaze Edg and the buoy of the Nower, putting our fleet with fireships in order to receive the enemy, if in case they should come up the Swin.' Dartmouth's belief that he was 'resolved' spoke volumes for his captains' and masters' powers of persuasion.

Having made a decision, or allowed himself to think that he had made one, Dartmouth lapsed once again into inaction. The fleet stayed put. Still the chill north-easterly blew. To the north, nothing but the mud and marshes of Foulness Island could be seen to relieve the gloom. To the south lay the mud and marshes of the Isle of Sheppey. After two days, the wind swung round to the west and blew even harder, forcing ships to strike down yards and topmasts, and when it eased, visibility once again was poor. Another two days passed before the fleet got under way again to the Gunfleet buoy, near Harwich, which was evidently still in position, and there they anchored outside the sandbank, clear of the West Rocks.

Whatever his officers might have been saying amongst themselves regarding William's likely intentions, from here Dartmouth could at least convince himself that they could deter any Dutch designs on Harwich. If William were spotted in the south heading for the Thames they might be able to intercept him, assuming co-operative winds and tides. If the Dutchman was intending to sail to Yorkshire, as some believed he might, Gunfleet could also serve[63] – again, winds permitting. Otherwise, it made little sense. Because far to seaward, between the English ships and the Dutch coast, lurked the long parallel shallows of Sunk, Long Sand and Kentish Knock. There were gaps in them, but they were narrow and unmarked by buoy or beacon. Getting out of the sands safely would require a favourable wind, co-operative tides, and a long dog-leg to the east before they could turn south, whether to protect the Downs or pursue the enemy along the south coast.

Dartmouth did actually know all this. Other options had been discussed. Back in August, Sir Roger Strickland proposed the Gunfleet as a fleet anchorage in preference to the Downs, but the idea was ruled out by the king: Gunfleet was 'a very ill road'. Instead, Strickland was instructed to adopt a wide seaward patrol line guarding the outer approaches to the Thames Estuary, between Kentish Knock and the northern end of the Goodwin Sands. This wasn't merely the king's oarsmanship, but the outcome of a conference between the king, Sir John Berry, four elder brothers of Trinity House, and four other naval captains. Pepys was at the meeting, too – and so was Baron Dartmouth.[64] The king, their commander-in-chief, was vehemently opposed to using the Gunfleet as a defensive anchorage. And yet here was his admiral, two months later, having persuaded himself – or permitted himself to be persuaded – to do just that.

As we have seen, Dartmouth was not a man to make a bold decision without first taking advice. He was biddable. He lacked self-confidence. He was aware of his own shortcomings both as a seaman and a leader. But he was not a fool – these waters had to be treated with the utmost respect. They were, in fact – as he knew from personal experience – quite terrifying.

Any conspiracy among senior officers to sabotage the navy's campaign against William would have had to be one of influence and persuasion. If that failed, mere inaction might do it. Drastic measures such as insurrection, mutiny, or defection were not called for. The tide of opinion was flowing against the king, and it ought to be enough to simply get out of its way. In council, Dartmouth's officers had seen by now that they only had to be united in their advice and he would be likely to follow it. As for his trusted master, if the admiral were to glance across the great cabin to seek his opinion, all Collins would have had to do was nod.

Winter was coming on. The wind blew hard, freshening in the west-south-west. Letters to and from the Admiralty were ferried between the flagship and Harwich on the *Cleveland* yacht, and on 26 October the *Quaker* ketch reported that she had seen twenty Dutch men-of-war and an assortment of fireships anchored off Goree. It seemed that William had indeed ventured out with his warships and transports, only to be driven back when the wind shifted. And a torrid time he had of it, his fleet dispersed and at least a thousand horses lost. Dartmouth procrastinated. Pepys received the news of the Dutch disaster late that night and wrote to Dartmouth at two in the morning to urge the admiral to take his fleet across the North Sea to compound their confusion. Dartmouth declined.

Next day the wind eased round to the north-west and soon a rumour reached the fleet – from the king, no less – that William was at sea again, with four hundred ships. Collins wrote that fifty of these were reckoned to be fighting ships and the rest an assortment of transports, 'flyboats, Dogger scootes and other vessels', carrying an army of 18,000 men along with horses and weapons. Dartmouth called a council of war to canvass opinion, but the wind was contrary and blowing hard, and it wasn't until two days later, 30 October, with the wind in the east and south, that he got his ships under way. They hauled up their anchors at one in the afternoon to take advantage of the ebb, but by six in the evening, tacking against a persistent easterly and with the tide on the turn, they had put just 10 miles between themselves and the Gunfleet. They anchored again, in open water, 'between the Sledway and the Long Sand Head, the Naze bearing W and the church

of Balsey NW ½ N. Much wind all night at EbS with a great sea. Struck yards and topmast.' This put the fleet 15 miles offshore, anchored in 12–15-fathom water. Pounding surf to the north showed the position of the drying Shipwash bank. To the south, further off but equally treacherous, Long Sand Head was picked out in the gloom by a line of breakers. Directly downwind, 5 miles distant but still uncomfortably close, lay the white-streaked teeth of the West Rocks.[65]

This was why navies did not campaign in winter. Conditions were extreme. For the next two days the fleet lay beyond any shelter, weathering the seas and praying that their anchors would hold. Dartmouth sent ships out on patrol to the north, east and south. One came back in on 31 October, her foretopmast gone. On 2 November they woke to find several smaller vessels missing, having fled for the safety of Harwich during the night. The *Nonsuch* snapped her anchor cable. The *Dartmouth* lost her longboat. And still: 'Much wind all day and night at E and EbN.'

Although the king's information was good – William's fleet in fact numbered 463 vessels, forty-nine of them warships, and of 40,000 embarked, more than half were soldiers[66] – its timing was off. William had not yet set sail. And when he finally did, on 1 November, Dartmouth's ships were trapped in their stormy open-water anchorage, facing the easterly wind.

On 3 November, Collins recorded that Dutch ships had been seen in the east, but had immediately turned southwards and made more sail when they saw they had been spotted. The nearest English ships buoyed their cables and cast them loose as they set off after them while the rest of the fleet weighed anchor and attempted to follow: 'But the tyde of ebb being most spent we could not wether the Long Sand Head and ye Kentish Knock,' Collins wrote, so they had no option but to anchor once more. As they tried again next morning, news came that the Dutch had been seen in the Straits of Dover, and were on their way down the English south coast.

Dartmouth's humiliation was not yet complete. William had a twenty-four-hour start, his sluggish transports pushed along by the so-called 'Protestant wind'. This time the English ships managed to extricate

themselves from the sands, and by eight that night they were level with South Sand Head, at the southern end of the Goodwins. The decks were cleared for action as the ships ‘made all ready for fight’, although the enemy were nowhere to be seen.

It was no more than a gesture to keep the miserable admiral’s spirits up. At midnight Dartmouth’s fleet was south of the Dungeness light, about 20 miles west of Dover, and the wind was beginning to falter. By eight in the morning on 5 November, as the king prepared to sit for a Godfrey Kneller portrait commissioned by Pepys,[67] the English fleet had made it as far as Beachy Head. And there they stayed, adrift on the tide, as the wind fell away completely. The fog came up. The *Montague* and the *Dartmouth* were damaged drifting into each other. The baron held a council of war.

Down in Devon, 150 miles to the west, William’s ships were dropping their anchors in Torbay, and his army was beginning the immense task of getting itself ashore, ferrying troops across to Brixham, hoisting horses into the water and swimming them to the beach, and setting up encampments. William’s soldiers marched along sunken country lanes and through muddy farming hamlets whose inhabitants stared slack-jawed at his Swedes, his Africans, his English, Swiss and Scots, his cavalrymen and foot soldiers, reflected in the gleaming armour of his elite Dutch Guards. The disembarkation would take two weeks.

Meanwhile Dartmouth, unaware of these developments, was sitting in the great cabin of the *Resolution* and writing an abject letter to the king explaining how he had come to fail so comprehensively in his duty. He felt that in the main he had been a victim of ill luck, although he might privately have wondered if he had allowed himself to be gulled into ill judgement too. He told the king that his flag officers and senior commanders had all separately advised him against challenging the Dutch at sea, because the English fleet was simply not strong enough. Before sealing the letter, he

added that Sir John Berry, Sir Roger Strickland and Captain William Davies all came in together to give him the same advice: not to engage.[*68] Unbeknown to the English, Prince William had been saying much the same thing to Herbert: avoid an encounter at sea.[69]

As he drifted on the tide off the Sussex shore, the admiral couldn't be sure, but he thought that William might be planning to land near Portsmouth. He did not quite know where all of his own ships were, either, the fleet being strung out along the south coast. Some had been sent out to scout for the enemy; others were simply stragglers. He assured the king that he was prepared to fight, even though all of his experts seemed to think it could only end in 'the destruction of the flower of the English fleet, or so many of them at least as are here at present'. With perhaps some relief at being able to place the ball in the monarch's court for a change, he said he would not engage the Dutch without further orders. And then he added: 'I understand the Prince of Orange changed his measures when he heard your Majestie's fleet was at the Gunfleet, for before that he intended for the river.'[70] This was useful in justifying his decision to wait for William at the Gunfleet, contrary to the king's orders. It also shows that William was well aware that the English ships were bottled up in the sands, so he could launch his invasion on the south coast with impunity.

The storm that then blew up and pushed the English fleet all the way back to the Downs had no bearing on the outcome of Dartmouth's campaign. But the winter weather was taking its toll on his ships. 'At three in the morning tackt and stood away WNW, the wind at SbW blowing very hard,' Collins wrote. 'At 8 a clock a storme at SW. The Assurance boare away and made a signal of distress, the storm increasing with raine, we boare away for the Downs having sprung our foremast.'

With her foremast dangerously weakened, the *Resolution* had no choice but to run downwind, and sped past Beachy Head and Dungeness making better than 10 knots. In the Downs a state of chaos reigned: the *Centurion* ran aground on the South Foreland at high tide, and no amount of heaving by ships' boats could haul her off. The *St Albans* ran hard onto the North Sand Head, her keel crunching the bottom several times, but she managed

to kedge herself free. At low water, Collins saw the *Centurion* high and dry as far back as her mainmast, while her crew heaved shot overboard and stoved beer and water casks to lighten her. Refloated on the next high tide with severe damage to her keel, she was ordered up to Sheerness for repairs.

By now, Dartmouth had heard that the Dutch were in Torbay, and called yet another council of his flag officers. What to do? On 13 November it was wintry, a chill easterly bringing 'gusts of raine, snow and haile'. There was talk of getting under way, but the wind was too strong. Pepys had written to the baron to say that Dutch reinforcements were on their way from Holland – 5,000 more soldiers in a fleet of transports escorted by just two warships. Down in Devon, as the transport ships were emptied, they were being sent into the River Exe. But William's battle fleet was still anchored in the bay.[71]

That same day, Edward Russell addressed a letter to Admiral Herbert in the perfect shelter of his Torbay anchorage to say that eight captains from the English fleet were ready to defect to William and the Protestant cause. They were serving in all three divisions of the fleet – Dartmouth's, Berry's and Strickland's – and the letter named not just Cloudesley Shovell and the 'pert' Berkeley, about whom Dartmouth had his suspicions, but Dartmouth's own rear admiral, Sir John Berry himself,[72] along with another two of Collins' Mediterranean associates: Hastings of the *Woolwich* and Aylmer of the *Swallow*, who had been working on Russell's behalf, canvassing opinion among his fellow captains.[73]

On 16 November, a welcome north-easterly sprang up and urged the English fleet back towards the west, 'being bound for TarBay to fight the Dutch fleet', although when night fell the ships shortened sail to avoid running into any enemy ships in the darkness. As they neared the Isle of Wight next day, having ascertained that there were no Dutchmen at Spithead or St Helens, both Captain Skelton in the *Constant Warwick* and Berkeley in the *Montague* decided that their ships needed urgent repairs and sailed into Portsmouth, playing no further part in the campaign.

Dartmouth was nevertheless determined to crack on, or at least that was the impression that he wanted to give. 'At noone made saile with a full resolution to fall in with the Dutch in Tarbay in the morning early,' wrote

Collins. There was that word again: resolution. Collins and his fellow officers must have long since ceased to wonder at it.

On 17 November, the king wrote his will and had it witnessed. Pepys was one of the signatories. The naval secretary remained loyal but could see which way the wind was blowing, and he took the opportunity to get James' signature on an IOU stating that he was owed the not inconsiderable sum of £28,000 by the Crown for services rendered. James duly signed it, but rather than sending it through the correct channels he simply handed it back to Pepys. He never got the money.[74]

At four o'clock that afternoon, the flagship and what remained of the English fleet were headed for Torbay, and by Collins' estimate, they were 12–15 miles south-west by south of the Needles, the distinctive chalk stacks at the western tip of the Isle of Wight. The wind was blowing hard from south-south-east and south by east. On a broad reach, Torbay and the Dutch invasion fleet were just 65 miles away. To bear down on the enemy under towering canvas would mean making their landfall in the dark, but shortening sail to maintain a speed of around 4 knots during the hours of darkness, as was customary, would put them in a position to attack at eight in the morning, a few minutes after sunrise. The Dutch would be embayed, trapped against the shore by the wind, helpless and unable to escape. The English ships could control their approach, moor to two anchors across the mouth of the bay, rig spring lines to the cables to direct their broadsides, and then wreak destruction upon the enemy battle fleet with their 32-pounders.

At least that was the theory. It was by no means certain that the timorous baron would take such an opportunity, should it arise. His fleet was dwindling by the day, and more experienced men than he had warned of the dangers of engaging the Dutch. But on board the *Resolution*, for the

moment at least, the admiral seemed determined to crack on and bring the enemy to action.

If ever there was a time for his officers to act, this was it. Other English captains had made their decisions – they were gone. William Davies, who had risked his career to rescue Huguenot refugees, clearly had no wish to see a Catholic succession in England, but as captain of the flagship he could hardly follow suit, wash his hands of Dartmouth's campaign and order the *Resolution* into Portsmouth. If Davies nevertheless decided that he had to do something – create some delay to give the Dutch more time to get ashore, and buy some time for those of his fellow captains who might still be undecided to quietly slip away – then it was at this point that he had to do it. What follows is necessarily conjectural, but it is founded firmly on Collins' record of events. For we know it was at this point, four o'clock in the afternoon of 17 November, that the master of the *Resolution*, old friend and shipmate of William Davies, made his crucial contribution. Whether the notion came from Collins or from Davies will never be known, but it could not have succeeded without their collusion.

So, in spite of their admiral's 'full resolution to fall in with the Dutch in the morning early', they didn't crack on towards Torbay. Davies didn't task his lieutenants with preparing the ship for battle. The gunner didn't start the idlers chipping rust off the round shot, and Collins didn't supervise the topmen doubling up lifts and braces to guard against falling spars.

Instead, Collins appears to have counselled caution. A straight course due west* from their position south-west by south of the Needles could have taken them directly into Torbay – but only by leaving the dangerous promontory of Portland Bill, and its fearsome tidal race, just a few miles to the north. That was too close for comfort.

Dartmouth would not have been hard to convince. The Bill's frightening reputation as a ships' graveyard was well known. The wedge-shaped headland juts 5 miles out into the Channel from the Dorset coast, funnelling the strong tidal stream into dangerous eddies and currents that run at up to 7 knots and form destructive standing waves well offshore. For any captain of an unwieldy square-rigged ship, or any admiral in charge of a fleet of them,

a mortal fear of Portland Bill was a rational attitude of mind. And as Dartmouth himself wrote to the king at this time: ‘The season of the year is intollerable, sixteen hours night to eight hours day with lea shores in the Channell is harder workeing than any battle.’[75] He felt the stress of his situation with singular intensity.

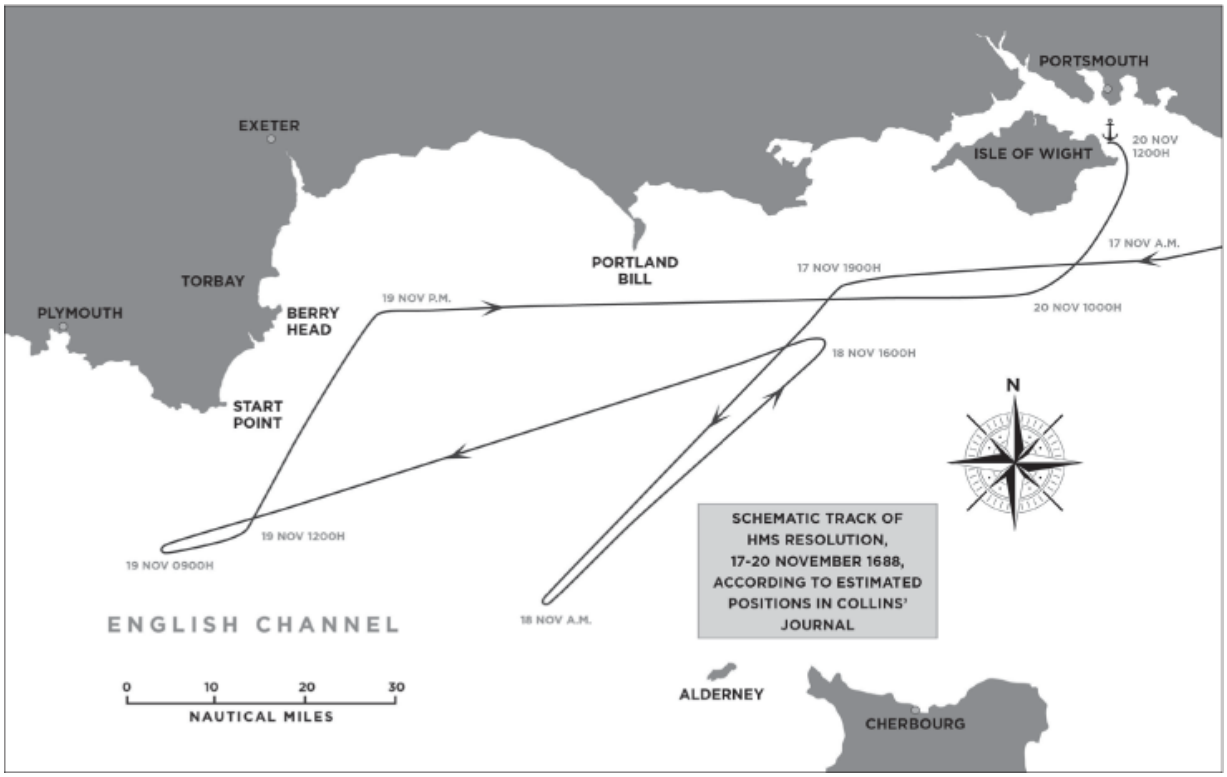
So Dartmouth would have willingly assented to any note of caution sounded by the *Resolution*’s peerless master, especially if seconded by the experienced Captain Davies. Safety lay towards the south. Well to the south, as it turned out.

First, they tacked and stood to the east, stemming the ebb tide as darkness fell to maintain their approximate position south-west by south of the Needles. At seven in the evening, the tide spent, they tacked again and brought the ship’s head around to face the west once more. The direct course to Torbay was 270° by the compass. An adjustment of one point to the south – 11° or so – until about two in the morning would carry them safely past the Bill, and clear of the perilous race. For the avoidance of doubt, a careful navigator might add another point, to allow for leeway. For the remaining hours of darkness, they could then settle onto a westerly course, with the tall cliff of Berry Head to give them ample warning of their landfall in the gloom of a November dawn.

Collins made no attempt to shape this course. Instead, he made an absurdly extravagant southerly correction of four points, 45°, putting their track diagonally across the incoming flood tide as it gathered pace. He wrote: ‘At 7 at night tackt the tyde of ebb being spent and stood off SW with the tyde of flood under our lee,’ meaning that the tide was against their starboard side, pushing them eastwards. In his later despatch to the king, Dartmouth copied Collins’ words almost exactly: ‘At 7 at night we tacked again and stood off SW with the tide under our lee.’ The wind was still strong, and still trying to blow them in towards Torbay, but they took in their foretopsail to reduce leeway and held the course until daybreak. It was four days after the new moon and the flood would have been running at 1½ knots, maybe more, as Collins knew. Its effect would be to give their course an even more southerly track. But when the tide turned, at one or two in the

morning, the outgoing stream would gather pace and gradually cancel out this cross-track error, returning them to their south-westerly course.

Sure enough, at daybreak, the flagship and the fleet dutifully following the glimmer of her stern lantern were on the French side of the Channel, with the island of Alderney in sight. After sailing all through the long winter night, they were barely 20 miles nearer to Torbay. The reason Collins offers for this in his journal is artfully vague, but echoes the explanation he must have given the admiral: 'We found that the tide of flood had made us to make a more southerly course than expected.'



Again, Dartmouth used almost exactly Collins' words in his long despatch to the king, but with one important difference: 'We found that the flood tide under our lee had caused us to make a SW course good.'[76] In an effort to impress his seaman king, it seems that Dartmouth was parroting jargon fed to him by Collins, which he didn't fully understand. South-west was not the course that the flagship had 'made good' after the unfortunate effects of a stronger than expected flood tide. It was their course made good

after the deviations to their track caused by the incoming tide and the outgoing tide cancelled each other out.* Collins steered south-west knowing that at dawn, two opposing tides later, they would still be heading south-west – and knowing, too, that the admiral was unlikely to question the judgement of the master. With but a vague grasp of the workings of the tides, as Collins perpetrated this deception the ever-trusting Dartmouth did not even think to look at the compass.

By now, if this is indeed what happened, Collins and Davies had done all they could. William was granted a valuable extra day, and winter storms continued to wear down the English fleet.

The wind was getting up again. The flagship hove-to as its straggling fleet caught up, and the weary admiral took stock of his situation. Just twenty-four ships were in sight, out of the thirty-five that Collins had listed back at the buoy of the Nore. Among those which had sloped off into harbour was the *Elizabeth*, flagship of Dartmouth's rear admiral, Sir John Berry. She took no further part in the affair. The remaining ships began the long haul back towards the English coast, and at nightfall, with the heights of St Albans Head showing above the horizon, they turned westwards towards Torbay. 'A hard storme' shredded their main and mizzen sails at one o'clock in the morning. Guns sounded in the darkness as ships signalled their distress. At daybreak Collins counted the fleet again. Another two had gone. They now numbered twenty-two, and were looking far from battleworthy. The wind swung round to the west.

If Dartmouth had still been entertaining any heroic thoughts, that would have settled it. From 12 miles off Berry Head on the afternoon of 19 November, in 'a fresh gale' from the west-north-west, the lookout at the topmast head of the *Resolution* could discern a forest of Dutch masts in the bay. Dartmouth decided he was going no further. He sent the fourth-rate *Jersey* in to have a look, and turned the English fleet back up the Channel towards Portsmouth. The weather turned foul again.

It was the end of Dartmouth's campaign, and the closest he came to having any effect on William's invasion. It wasn't very close at all.

The success or failure of the Dutch invasion is one of the great counterfactuals of English history. A battle, on the sea or on land, could have changed everything, pitching the country into another bloody civil war – one which did in fact take place, but on Irish soil, not English. And even after all the good fortune that William had enjoyed in being able to land in Torbay unopposed, his invasion could still have failed. He had been getting his forces ashore for more than ten days by the time of Dartmouth's 'full resolution to fall in with the Dutch in Tarbay in the morning early', but this did not mean that English intervention would have been too late. Dropping anchor in Torbay was just the first stage in a major operation for the Dutch forces. The Prince of Orange brought with him 5,000 cavalry horses and another 2,000 draught animals, each of which had to be lowered into the water and encouraged to swim to the beach. Then there were arms and provisions for a 20,000-strong army to be hoisted into boats and rowed ashore, to say nothing of the soldiers themselves, for although William had been assured of local support once he arrived in England, he wasn't banking on it. The prince intended his army to be self-sufficient, and as a result it took the Dutch a fortnight to get themselves off the ships and onto the long road to London.[77] And although William himself had already set up his headquarters in Exeter, it wasn't until 18 November, while the English fleet was beating back across the Channel from Alderney following Greenvile Collins' time-wasting detour, that he sent his forces to occupy Plymouth and secure his rear, in preparation for his planned advance towards London. The sudden appearance of twenty-four determined English frigates belabouring the camps and destroying the transport ships with their heavy cannon would have created chaos. How determined Dartmouth's fleet would actually have been, of course, is one of the many questions to which the hapless admiral had no answer.

Whether a successful naval engagement down in Torbay would have made any difference to King James is another moot point. His mental state

was as fragile as the flimsy support for his cause that he had managed to shore up in London. He left the capital on 17 November to join his army at Salisbury, on the main road to the West Country, oppressed at every turn by bad news that just got worse. Protestant insurgents captured several towns in the North and the Midlands, his daughter Anne fled, and several army commanders, including two of his most senior, John Churchill and the Duke of Grafton, defected to the Prince of Orange. James had indeed sailed the ship of state onto the rocks, and it was starting to come apart. He didn't have the stomach for a battle, and once at Salisbury he turned around and went back to London. He attempted to open negotiations with William, but they got nowhere. At the end of the month, he issued a Proclamation for a Parliament, which was a major concession to his opponents – Parliament hadn't sat for three years – but it just made him look desperate. Nobody was impressed, although the loyal Dartmouth held a council of war aboard the *Resolution* to discuss it, and sent the king a letter of support from the fleet.

On 9 December, James put the queen and their baby son aboard a ship in Kent and sent them off to France and safety. When he tried to follow them a few days later, in disguise, he was captured by Kentish fishermen hunting down escaping priests, and sent back to London. This was embarrassing for James but also inconvenient for William, who had been invited into the capital and was well on his way there when he heard of James' return. But the king had no wish to contest the issue and was quietly allowed to escape. This time he succeeded.

James had originally sent the little prince to Portsmouth where, as Collins noted in November, Baron Dartmouth and his captains went ashore to pay their respects, and the fleet fired a twenty-one-gun salute in honour of the Catholic heir. But when James asked Dartmouth to carry the child away to France, the admiral refused.[78] There were limits even to his loyalty. And when Dartmouth heard of the king's flight to France, in mid-December, he renounced the Catholic king he had served so faithfully, if ineffectually, and threw in his lot with the Prince of Orange and his wife Mary, 'to dispose the fleet under my command to joyne with your Highnesses, and concurre in the good ends you have hetherto pursued,

towards supporting our religion, laws, liberties and properties …' In fact his fleet had already more or less made up its mind.

By this point, William had reached Windsor, and to carry his letter there Dartmouth appointed Captain Aylmer, 'who is my very good friend, and is intirely devoted to your Highness, being a firm Protestant and an honest man'.[79] Aylmer chose to take Captain Hastings along with him.[80] This collusion came as no surprise to the admiral, for he had heard by now of an earlier plot: Dartmouth was to have been lured aboard Captain Hastings' *Woolwich* on the promise of dinner, and then held captive while the Duke of Grafton took command of the king's fleet.[81]

Such drastic action did not turn out to be necessary. William took swift control of the situation. Sir Roger Strickland and the few other Catholics in the fleet resigned their commissions, as Collins noted on 13 December. Sir John Berry took over as vice admiral, and Lord Berkeley was promoted to rear admiral. Dartmouth, with half the fleet, was ordered by his new commander-in-chief to report the Buoy of the Nore. The other half was to remain in Portsmouth, under the command of Sir John, to keep an eye on the French.

The remaining few pages of Collins' 1688 journal are as lucid and businesslike as all the others, maintaining his professional distance from events, and giving a bare minimum of space to the rumour and gossip flying around the fleet, or to the amazement and disbelief that greeted the news of the king's flight and the defection of his navy. For the sake of the record, Collins allowed himself to make the briefest notes of the extraordinary events that unfolded: 'The queen and Prince of Wales went away from Whitehall very privately, and said they are gone for France, Some report that the King is Privately gone away likewise. Much wind at WSW with raine.'

There was work to be done, and he got on with it. Dartmouth's squadron sailed from Spithead at eleven in the morning on 30 December, in uncharacteristically light airs and 'cold frosty wether', anchoring off Dungeness to await the turn of the tide, and then anchoring again in a thick fog when just 4 miles west of Dover. They arrived off the Downs in the darkness late on 1 January, and then shifted inshore to the admiral's berth next day – whether at Dartmouth's insistence or on the orders of Captain Davies, to keep the admiral's spirits up, Collins didn't say.

The winter weather howled back in with a vengeance: 'Much wind from ye SSE to the E blowing very hard with very thick weather, soe that the pylotts would not adventure to sayle. Very great frosts.' Guns were fired from ships in distress. The *Sedgemoor* was driven ashore. The foul weather continued some days until the *Resolution* and her remaining ships – Berkeley and his squadron having been ordered back to Portsmouth – got themselves under way again on 8 January, 'the wind blowing very hard with much snow, sleete and frost'. With a fresh gale from the south-south-east, the few hours of daylight and the driving snow, it was not a day for negotiating the Thames Estuary, so they anchored at the Shipwash bank, 8 miles off the Suffolk coast, in the late afternoon. Sails and rigging were frozen stiff. 'We had much trouble to furl our sayles.'

They rode all next day at anchor in thick fog and light winds, awaiting their chance to make another attempt at the estuary, until out of the evening darkness loomed the towering form of the *Pendennis*, drifting down on the tide towards the stationary flagship. There was nothing to be done. *Pendennis* was a seventy-gun third rate like the *Resolution*, but of more recent construction, larger in every dimension and much heavier, and she crunched beam-on to the flagship's bow with unstoppable momentum. For a few moments chaos reigned in slow motion on board both ships, and for Dartmouth the horrors of years ago must have come back to him like a nightmare, when his diminutive sixth rate was run down by the *Fairfax*, and when the *Gloucester* foundered, breaking up and sinking as she drifted into deep water.

But this time the winds were light, the *Resolution* had no sails set, and unlike the *Gloucester* she didn't have King James aboard, countermanding orders and causing confusion. Captain Davies with his lieutenants and Greenvile Collins took things in hand, and got the men knotting and splicing and working with axes to disentangle the wreckage. Among other damage the *Resolution*'s bowsprit had been completely sheared off, and with the wind increasing they cut it free. At one in the morning, they found their anchor was dragging, but they loosed the small bower and it held. The men rigged a jury bowsprit out of a spare topmast and stayed the foremast as best they could, as visibility improved gradually. 'Little wind till one a clock in the night, and then the wind came out at NE, blowing very hard with much snow, we struck yards and topmasts.'

It was the morning of 11 January. The north-easterly blew harder, 'and the Sea very high, our ship riding hard and in danger of pitching our foremast by the board'. If they were to make the Nore in daylight, it was now or never. At a nod from Captain Davies, Collins ordered the topsails loosed and the anchor cut free, and they bore away downwind, abandoning the swamped longboat towing astern as they headed into the estuary, past the Gunfleet buoy and up the Swin Channel, those bleak, grey and inhospitable waters which the admiral would forever associate with the failure of his campaign. 'At 3 a clock anchored at the buoy of the Nower, the wind blowing fresh at NW.' There, in the winter gloom, ends Collins' 1688 journal.

In a letter he wrote to William pledging his loyalty, Baron Dartmouth described his 'great amazement, confusion and griefe of heart' at the royal family's flight to France.[82] He had been betrayed twice, first by the navy and then by his king. As to the loyalty of the man in whom he had invested the most trust, Greenvile Collins, he must have come to harbour doubts. By now he doubted everybody. But in the most trying of circumstances at the bitter end of the campaign, with Dartmouth wondering yet again whether his last hour had come, Collins – at the cost of one expensive anchor and one longboat – brought his ship, and his admiral, home safe.

Manuscript draft of Collins' superb Chart Q, of the Moray Firth. (UK Hydrographic Office)

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* She was the daughter of Edward Hyde, who was Charles II's Lord Chancellor and the strictest of fathers: when he discovered his daughter was carrying on with the Duke of York, he called on the king to have her executed. [Miller.]

† William's mother was Mary Stuart, sister to Charles II and James II.

† History has granted Sir Christopher Wren slightly more credit than he deserves in this case. The Monument seems to have been mostly, if not entirely, the work of Robert Hooke. [Inwood p. 130.]

* Probably three-pounders. She might have had eight of them.

* Take as a random sample the *Gloucester*'s nine sister ships from the late-1652 large frigate build programme: *Marston Moor* was lost in a storm on the Shipwash bank; *Bridgwater* blew up in an accident at Sheerness; *Torrington* sank off North Foreland; *Langport* was wrecked in Plymouth Sound; *Tredagh* was burnt by the Dutch; *Newbury* was condemned by Admiralty Order; *Fairfax* was bilged at Grays and written off. Only *Plymouth* and *Lyme* survived. [BWAS.]

† The loss of the *Gloucester* with the Duke of York on board had serious political implications, and conspiracy theorists had a field day. The episode is well elucidated by Jowitt.

* The York Watergate still stands, as does Pepys' house, just up the steps at number 14 Buckingham Street, but the river is now some way off. [www.british-history.ac.uk/survey-london/vol18/pt2/pp63–76]

‡ Bawdsey.

† There were two other nearby churches within a mile of the coast, at Alderton and Hollesley, which suggests that Collins knew the specific sound of Bawdsey's bells.

* Sceptical historians (e.g. Rodger, p. 139) point out that the Catholic Strickland would hardly have joined with pro-Protestant conspirators. But he was in an impossible position. Besides, self-preservation is a powerful instinct even among admirals, to say nothing of service loyalty. On this matter of the relative strengths of the fleets, Strickland might simply have agreed with his fellow officers.

* Allowing for the 1688 magnetic variation of about 4°30'W.

* From Collins' estimates of distances off the Isle of Wight and off Alderney, it does seem that their course made good on that night was just a couple of degrees south of south-west.

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7

A Multiplicity of Herberts

She seems to be of a good nature, & that takes nothing to heart, whilst the Prince her husband has a thoughtfull Countenance, is wonderfull serious & silent, seemes to treate all persons alike gravely; & to be very intent of affaires, both Holland, & Ireland & France calling for his care.

Diary of John Evelyn, 22 February 1689

Climactic events provide convenient conclusions for works of fiction, but history doesn't work that way. Life goes on. William's *coup d'état* was achieved, perhaps, in too little time and at too little cost to appeal to the novelist, despite being as climactic an event as British history can offer – much more so than the Civil War and the execution of Charles I, which although cataclysmic in themselves were soon annulled by the Restoration. The Glorious Revolution, by contrast, was not an ending but a beginning. Real and fundamental change occurred so quickly and so thoroughly that there was no going back.

Once in London, William had to move fast. He had already been third in line to inherit the kingdom, after his wife and her sister Anne, but once Prince James was born, and a Catholic succession assured, it had become clear that for the foreseeable future he would be getting no help from the English in his struggle with France.

The letter from the 'immortal seven' inviting the Stadtholder to look into 'the condition of English liberties', and the new-born prince's legitimacy, was no more than a legal fig leaf to conceal Protestant plotting within the English establishment. William's most pressing concern was to get the English navy onside before the French invaded the Dutch Republic – an eventuality that was confidently expected in the spring of 1689.[1] In the hastily assembled Parliament, the House of Lords was divided between supporters of James and supporters of a fudge, in which William and Mary could rule as regents until James either died or came back. The existence of baby James, the king's heir, and the catalyst for all this confusion, seemed to be forgotten. In the Commons the legal position was that King James had effectively abdicated: 'The throne is thereby vacant.' The arguments reached a stalemate, and the Lords finally blinked when William said he would go back to Holland rather than rule as regent. The crown was duly offered to both William and Mary in February 1689.[2]

At the coronation in Westminster Abbey, the Declaration of Rights was read out, later to be passed into law as the Bill of Rights, limiting regal power, upholding the ancient privileges of Parliament, and confirming the rights of petition, free elections and consent to taxation.[3] The age of

absolute monarchy had given way, at least in England and Scotland, to the principle of constitutional rule. The coronation itself, William felt, seemed a 'quaint old Popish ceremony'.[4] Life went on.

Or not, as the case may be. The unfortunate Baron Dartmouth was never able to convince the new king of his loyalty, despite being a confirmed Royalist and an avowed Protestant. On presenting himself to William in January 1689, with the *Resolution* undergoing repairs at Deptford, he was stripped of his naval command and other offices, and although he took the oath of allegiance in March, this was not enough to allay the suspicions that lingered among William's coterie at court. He was eventually tried and imprisoned in the Tower of London, and there he died, after suffering a stroke, in October 1691.[5]

Sir Roger Strickland and a handful of other Catholic captains were also dismissed from the service, some of them following James to France and joining Louis XIV's navy. Most naval officers, whatever they might have thought of William's coup, simply put their careers first and continued to serve the new regime.[6] William Davies had no difficulties. In a sign that there had never been any doubts as to where his loyalties lay, he was soon promoted. The captain of the *Resolution*, flagship of the fleet that James sent out to oppose the Dutch invasion, was by the summer of 1689 William's Vice Admiral of the Red. He reported to Admiral Herbert, who now rejoiced in the title Earl of Torrington and Baron of Torbay, and commanded the combined Dutch and English fleets.[7]

Life went on for Greenvile Collins, too, although perhaps not in quite the direction he would have wished. He had much to do if the *Pilot* was ever going to be published, but plenty of other demands on his time. His reward for services to Protestantism during the Glorious Revolution was also a promotion, and to a unique position of trust: yacht captain to the King. For William to grant such an honour to an unknown hydrographer, an officer he would never even have heard of until Davies surely gave him a ringing endorsement – 'this man is one of us' – was a vote of confidence even more fulsome than that of Charles II, eight years earlier, when he entrusted his teenage son's nautical education to Collins' care.

As the king's senior yacht captain, he was tasked with transporting not only the monarch and his immediate entourage, but also the king's ministers and other eminent persons, often with a sizeable escort of warships. For Collins it was, of course, an enviable step up the career ladder, and a great honour. He could hardly have turned it down. But William was an exceptionally busy man, which meant that Collins was too. The great survey had taken a back seat.

And unfortunately for Collins, the new king was pretty hard work. Sullen, preoccupied and obstinate, William not only lacked the breezy charm and entitlement of his Stuart predecessors, but he was no seaman either. Ships and boats were simply transport. He derived no pleasure from the bubbling rush of the wake, nor from the urgent heel of a yacht tracking across the breeze. Beauty in the taut curve of a perfectly drawing sail was lost on him, the song of the wind in the shrouds a mere intrusion on his thoughts.

In these and other respects William III was as unlike Charles II or James II as he could possibly be, which was fortunate for the English constitution but infuriating for Greenvile Collins, who made little effort to disguise his ire when he wrote to the Lords of the Admiralty from the yacht *Mary*, after a trip across to Holland from the Thames.[8] The royal yacht was secured to the canal bank in the port of Schiedam, 10 miles up the River Maas. It was January, freezing and foggy, the channels and swatchways on the Dutch side of the North Sea were choked with ice, and Collins had nearly lost the king. The language of his letter is infused with frustration at the Dutchman's antics – ignorant and irresponsible, to a seaman like Collins – mixed with a forgivable self-justification, and relief at the episode's eventual outcome.

As he recounted in his letter to their Lordships, four days earlier they had been 3 or 4 leagues off the Dutch coast when they spoke to a Dutch fisherman from the island of Goree. He assured them that the Maas, or Maze, was clear of ice as far upriver as Schiedam. 'Soe we shear'd in for the Buoys of the Maze according to the ffishermans directions, but could not see land nor buoys.' They anchored in the fog – 3 fathoms – and in the

eerie winter stillness watched lumps of ice drift slowly out of the river and bump against the yacht's hull. By Collins' reckoning they were still 3 or 4 miles outside the estuary. Their warship escort was anchored in deeper water, somewhere behind them. There was nothing to do but wait for the fog to lift.

But the king had no time for this seamanlike caution. He needed to get ashore – he was expected in The Hague. 'The King being very impatient, was resolved to go a shoare in the yacht's boate,' Collins wrote. 'I used all means possible to persuade the King to the contrary & that it was very dangerous considering the great ffogg and the ice that lay about the shoare, But nothing could persuade the King.' They had a Dutch pilot with them, who was telling the king what he wanted to hear: everything was fine. The king was convinced that he had no need of Collins' advice and assistance. 'He saying that it was calme and smooth, and that his Duch Pylot thought it not dangerous in the least.'

So there they were, anchored in zero visibility, several miles out from a low, sandy coast, unsure of their position, with a tide running. It was freezing cold. Fog condensed on the rigging and froze. The king wanted to place his trust in this pilot of unknown abilities – Collins clearly thought the man was an idiot* – leave the security of the yacht, and take off into the mists in the *Mary*'s longboat. To any rational being it would surely have seemed risky. To a man of Collins' seagoing experience it was simply insane. But the king was a land animal. And he was the king. 'Soe about one a clock past noone the King went away for the shoare in our boate,' Collins wrote. The *Mary* had made the trip in company with two other yachts, the *Katherine* and the *Fubbs*, who were anchored nearby, and Collins insisted that their boats went, too. He gave the king's pilot a compass and a lead-line, and watched the three boats disappear. He must have wondered if they would ever be seen again, and how he was going to explain to their Lordships that he had managed to mislay the monarch.

The boats drifted around in the icebound estuary all night, as the pilot proved himself to be just as useless as Collins had feared: 'By the forwardness and unskilfulness of the Pylott, they lost themselves in the

ffogg and the ice and could not find shoare nor yachts notwithstanding we ffired guns constantly,' he told their Lordships. 'I thank God it proved little wind and calme all night and next day.' The king finally arrived on shore at dawn, chilled to the marrow, but found they had drifted well off their intended track up the Maas, and were instead on the island of Goree, 7 or 8 miles south of where the *Mary* lay at anchor. All the while her fretful captain paced the deck, fearing the worst.

Of course it ended well, and their Lordships shared Collins' relief as he brought his suspenseful tale to an end: 'The King went ashore and warm'd himself by a ffire and there took an other Dutch Pylott for the Maze, where the King landed safely and in good health.'

He was still furious, of course, and professionally offended that the king had disregarded his advice. He couldn't say that to the king, so he emphasised the point in his letter: 'Had the wind blowne anything hard, the King might have bin in great danger, he was 22 hours in the boat being a very cold night.' He had also had plenty of time to rehearse his excuses if things turned out badly, and it seemed a shame not to use them: 'I prayed his Majtie to take mee in the boat with him, but he answered that he was well satisfied with his Pylott.'

For all the ice and the fog and the idiot pilot, this trip from the Thames across to Holland was routine, and had been long planned. Like the good yacht captain that he was, Collins had the comfort of his owner uppermost in mind, and back in December he had written to the navy commissioners to request 'a sute of coullers wth standard and pendants of silk or worsted, as yr Hons shall thinck fitt', adding as an afterthought: 'Likewise cotton cloth for spreding the flore of the State Room & Bed Chamber.'[9] The palatial cabin across the stern was now the preserve of the king and his courtiers, while Collins had to make do with a hutch-sized compartment further forward. For his part, William was resigned to spending increasing amounts of time on board the *Mary* as he travelled between his domains, and ordered Collins to arrange some alterations to his accommodation. Collins duly forwarded the request:

> His majesty the last time goeing over to Holland commanded me to acquaint with his pleasure that he would have the bulkhead of the bed chamber removed further aft to make the more roome in the Den, being the place where his Maj dines and sups, and likewise canvas for an awning for the quarter deck. I most humbly pray yr order to the builder.[10]

The documentary record is patchy as always, but nevertheless shows clear evidence of Collins' workload in his new role. He seems to have been on duty all the time. From the State Papers we learn that in May 1691 he received an order from Viscount Sydney in The Hague, 'to receive on board the sister and daughter of the Earl of Portland, with their servants, retinue, and necessaries, and to sail with them to the Thames and then return to Rotterdam'. It is a request that respects his seniority in the yacht squadron, for the Earl of Portland was William Bentinck, a Dutchman and a favourite of the king's.[11] In June came another order from Sydney, 'directing him to sail to the Thames from Rotterdam, for the purpose of victualling in England – the victualling for ships being cheaper and better there than in Rotterdam, and then to return'. One of the so-called 'immortal seven', and a long-standing supporter of William, Sydney wrote again in August from the army camp at Gembloux in Belgium, directing Collins to 'receive on board Don Manuel Coloma, Ambassador Extraordinary from the King of Spain, and carry him to the Thames and then to return to Rotterdam'. The Queen of Spain was his passenger on another occasion, again beset by wintry weather, when the *Mary* and escorting frigates brought her 220-strong retinue from Vlissingen to the Downs. There she transferred to Lord Russell's second rate, the *Duke*, for the onward voyage to Corunna.[12] Collins was calm, respectful and professional in his dealings with these dignitaries. Russell described him as 'a good man'.[13]

Meanwhile, Collins was also trying to get his *Great Britain*'s *Coasting Pilot* written, drafted, engraved, proofed, printed, bound, and published. The survey had been an epic struggle. It still wasn't finished. There were gaps in its chart coverage on the south and east coasts of England which, to judge from his numbering system, he had clearly intended to fill. Eastern Scotland was fairly well covered, thanks in no small part to the surveys of John Marr and John Adair, but in the west he had got no further north than the southern shore of Galloway. His meticulous 1688 survey of the Medway could have been adapted for inclusion in the *Pilot*, either as a chart in its own right, or to enhance his coverage of the Thames Estuary. But soon after William's succession, Collins began to realise that there would be no time for any of this. The king's demands were such that the harassed hydrographer saw no option but to go ahead with what he had.

Collins was an experienced sailor, a superlative navigator, and an accomplished surveyor, but he was no publisher. Clawing a third rate off a lee shore, riding out a storm at anchor, battling Barbary privateers – these were all in a day's work for a naval warrant officer, and there must have been times during the production of the *Pilot* when he longed for the sea's simple certainties. On board ship, no one knew more than he did. In publishing, everybody did.

London's printing trade was concentrated around St Paul's and the Tower, in streets by now largely rebuilt since the Great Fire, although the cathedral was still a construction site. Chandleries and nautical chart-makers gravitated eastwards and towards the river, around St Katherine's, Wapping and Ratcliff Highway, where the remaining studios of the Thames school of manuscript chart-makers were also still to be found. Greenvile's cousin Freeman Collins' printing workshop, where the text of the *Pilot* was typeset and printed on a flatbed press, was at Black and White Court, Old Bailey,[14] between the cathedral and the Fleet River. The charts themselves, which required a larger rolling press,[15] were probably printed in another workshop close by.

Engravers caused Collins no end of difficulty. As skilled craftsmen, they were self-employed, living above their studios, and dotted about throughout

the City and Westminster. Herman Moll, the German cartographer and map seller who later published several renowned atlases, had a shop at Vanley's Court in Blackfriars in 1688, moving further west three years later to Spring Gardens in Charing Cross. James Moxon, son of Joseph, the well-known globe-maker, had his workshop in Warwick Lane, close to St Paul's.[16] The engraving of each plate cost Collins £5. Bookbinders were also freelancers, whose rate for stitching the pages together, glueing the folded charts into place, affixing stiff leather covers and tooling the spines, was 8*s* per *Pilot*. The distributor of the completed atlases, Richard Mount, worked out of a shop in the Old Postern, a redundant gatehouse on the north side of the Tower of London's moat.

Collins used a number of engravers – at least eight, according to the signatures. Moxon did a fine job on the chart of Milford Haven, while Moll engraved no fewer than six of the *Pilot*'s plates. These include the complicated approach through the Essex mudbanks to Harwich, and the superb Chart Q of the Moray Firth. The most prolific of Collins' engravers was one John Harris, who signed himself both I Harris and J Harris, and cut not only the large three-plate Chart 5/6/7 of the English Channel, and the two-plate Chart 2, Dover to Spurn Head, but also the charts of Torbay, Carlingford Lough, Blakeney, the Isle of Wight, and Kinsale.

Some engravers were specialists. Collins' older brother James seems to have been employed principally for his skill at cutting elaborate cartouches, along with another engraver, Nicholas Yeates, and they worked on ten of the plates between them. It is likely that as an outsider in this arcane world of map publishing, Greenvile allowed himself to be led by the experts in matters of myth, symbolism and allegory, confining his input in the cartouches to a few broad suggestions regarding tone and content, and then leaving them to it.

For most of the cartouches, once the dedicatees' coats of arms were cut in, the engravers seemed happy to offer a mere nod to the nautical nature of the product, recruiting a menagerie of mermaids and their male counterparts. Cherubs proved a reliable standby for setting off the scrollwork, while fish and anchors were useful in filling up the foreground.

Pastoral imagery was surprisingly popular, the livestock often looking slightly bemused by their surroundings. Large birds with webbed feet also made an occasional appearance.

On a select few of the charts, the imagery employed was quite specific. Chart 19, for example, dedicated to the East India Company, is decorated with cornucopia and other flattering symbols of wealth and plenty. Chart 27 of Holyhead references St Patrick and the snakes. The chart of Fowey, number 17, was dedicated to the Bishop of Bristol and sports a bishop's mitre on top of its cartouche. In the iconography of the Torbay chart, number 14, the figures of Justice and Prudence present William's invasion as both a righting of wrongs and an act of wisdom.[17] Chart 30 of Chester and the Rivers Dee and Mersey, dedicated to the king himself, is illustrated with an eminently appropriate legend from the city's history: Saxon king Edgar the Peaceful, being rowed on the river by eight subjugated princes.

Just a handful of the charts allude to their creator. On the Plymouth chart a pair of cherubs are having a go at measuring the scale bar with some surveying chains. Opposite the cartouche on Chart 19, they are at it again with a pair of dividers. By the time they get to Chart C, north-eastern Scotland, they have also acquired a cross-staff, apparently with no more idea of what to do with it than the mermaid with her dividers on Chart H, of the Humber Estuary – although the Jacob's staff in her other hand seems to be claiming most of her attention.

As well as having only a vague notion of how navigation and survey instruments were actually employed, the engravers were also confused by the superfluity of titled Herberts that Collins tasked them with in his dedications. Henry Herbert, at least, offered no difficulty. He was the Duke of Beaufort, Earl of Worcester, and Baron of Chepstow, Raglan and Gower, and he accepted the dedication of the Milford Haven chart in his capacity as the Lord Lieutenant of Wales.

But then there was Arthur Herbert – Earl of Torrington, Baron of Torbay, First Lieutenant of the Admiralty and Captain of the Narrow Seas – whose name was inscribed on Chart 16, of Plymouth Sound. And finally there was Thomas Herbert – Earl of Pembroke and Montgomery, Baron of

Sherland,[*] Admiralty commissioner and privy councillor – to whom Chart 14 was dedicated, of South Devon and Torbay.

Unfortunately, since Arthur Herbert was not only Baron of Torbay but also the Admiral who brought William's fleet to anchor there during the Glorious Revolution – and who, disguised as a common seaman, had carried the letter from the 'immortal seven' to William – it was obviously not Chart 16 that was intended for him, but Chart 14, whose cartouche depicts, in considerable detail, his ships filling Torbay as boats carry William's army ashore. But the engravers got these two Herberts the wrong way round. Since they shared not just a surname but also a coat of arms, it is perhaps not too surprising.[†]

Collins must have been away in the *Mary* at the time, or called to the printers to correct some proofs, or maybe he was simply trying to spend some time with his family. If he noticed this transposition of Herberts on his return, he let it go. Life was short. In any case, the only Herbert who was actually a paying subscriber to the *Pilot* was the other one: Henry. His chart was fine.

As freelancers, engravers had numerous clients, each with his own particular requirements, multiplying the possibilities of confusion and error. It wasn't just Collins – it happened to everyone. An eminent contemporary cartographer, Joel Gascoyne, began work in 1692 on perhaps the most ambitious and accurate land survey yet seen in Britain: the whole of Cornwall on a scale of nearly 1in to the mile. It took him six years, and the finished map, printed from several plates, measured 6ft by 4½ft. Nothing like it would be seen in Britain until the advent of the Ordnance Survey, more than 100 years later. Drafted meticulously from pinpoint-accurate surveying on the blasted heaths and windswept headlands of the distant county, Gascoyne's map was nevertheless let down during its production in London's frenetic print district. Down at the bottom of the map, the latitude for the tip of the Lizard peninsula is reasonably accurate, but as his parallels move north they become progressively less so. The accumulation of error is so consistent that it seems to stem from a simple confusion between statute miles and nautical miles – an elementary mistake, but one that is all too

easy to imagine in a busy studio with numerous deadlines competing for attention. One study concluded that the fault probably lay not with Gascoyne, but with his engraver. Collins knew him well – it was John Harris.[18]

Joel Gascoyne was probably used to having complete control over his work, having served his apprenticeship in the Thames school of manuscript chart-makers down near the river, where everything about the finished product depended on his own skill with pen and ink. But printed, copper-engraved charts had begun to dominate the market, so he had diversified. When he was back in town from Cornwall during the winters, supervising his apprentices in the studio at Wapping and commuting between printers and engravers, whenever he and Collins ran into each other they could have had many a rueful conversation about the iniquities of the business, where every stage of production compounded the possibility of error.

It wasn't just engravers that needed supervision. There were also draftsmen. Collins would have produced a manuscript draft for each of his charts, but numerous additional copies were needed. The king and the Duke of York were each given one as they were completed, as was the Admiralty.[19] Sponsors and dedicatees might also have been sent them as a courtesy, or for approval. He eventually billed the Admiralty for 120 of these hand-drawn drafts.[20] Each was unique, and therefore had to be thoroughly checked – especially the master copies destined for the engravers.

Twenty-four surviving manuscript charts from Collins' survey were discovered in the archives of the UK Hydrographic Office in the 1830s. Although one of them has been inscribed 'By Greenville Collins RN, 1681–88' in immaculate copperplate by some reverent Victorian hydrographer, and another bears the less reverent annotation 'Supposed by Grenville Collins 1688', as a portfolio they appear to have been drawn by at least two different draftsmen, and possibly three, whose graphical styles and varying abilities with a quill are plain to see. Comparing the manuscripts to the numerous sketch charts he made in his journals, it is possible to pick out a few that look like they might have been drawn by Collins himself. A

comparison with the printed charts – mainly of the mistakes – makes it seem unlikely that any of these surviving manuscripts were the master copies which the engravers used. But they do serve to underline the complexity of the *Pilot* project.

The strange goings-on with the latitude scales along the margins of some of his charts, examined in Chapter 5, are not the only issues that are difficult to reconcile with Collins' contemporary reputation as an accomplished seaman and superlative navigator. They were just one symptom of the pressure that the production of the *Pilot* imposed. It was difficult, exacting work, which he had not been trained to do. There were a lot of people involved, undertaking numerous different tasks, and creating multiple versions of his original work. Collins had a hard time keeping track of it all. He was a naval officer, not a publisher. It was as if he had just got the foresails trimmed to perfection only to discover that the mainmast hands had knocked off for lunch. Production of the *Pilot* was pulling him in all directions, and he would undoubtedly have managed better if he were not being pulled frequently in other quite different directions by the king.

At an advanced stage of production, several of the charts were discovered to need amendments, which meant either having the plates sent back to the engravers, or dragging the engravers into the print shop to make the changes on the spot. Chart F was one. A useful and fairly large-scale view of the port of Yarmouth and the tricky sandbanks that encumber its approaches, this needed an extraneous lighthouse removed from the shoreline, close to the edge of the cartouche. The lighthouse actually made it into at least one copy of the atlas. Several other charts were also included in early bindings lacking their numbers,[21] which suggests a keen initial demand for the *Pilot*. Mistakes on these were corrected quickly. On the Cardigan Bay chart, number 26, the scale bar was moved to sit directly under the cartouche, presumably for aesthetic reasons. Traces of the original bar can still be made out in early impressions, such as the Guildhall Library's copy in London.

Chart 12, of Portland Bill, required more radical surgery. Not only were some sandbanks needing adjustment, but the entire bottom-left corner of the

plate had to be physically cut off and a new section substituted, which is betrayed by a telltale misalignment of the borders in some copies.* The corner includes the cartouche, with its dedication to Captain George St Lo, which is probably the reason for the change. The name of the original dedicatee is unknown. Perhaps he was expunged because he failed to come up with his subscription, or he might have been a supporter of the recently deposed James II. Early versions of Chart 27, Holyhead, show the need for a similar amendment to the cartouche, though one that required less drastic intervention: a Thomas Hewetson was rubbed out and replaced by one William Wright.

As soon as it is too late to correct them, mistakes sought on proofs but somehow missed have a way of coming out of hiding, wearing a slight smirk. It didn't help that Collins wasn't much of a proofreader. Obvious errors went uncorrected. On his chart of the St George's Channel, for example, he really ought to have spotted the fact that although the latitude scales match each other perfectly, their numbering is wildly eccentric: each degree consists not of 60 minutes, as it should, but of two batches of 30. There is no plausible explanation for such daftness except the ignorance or inattention of a draftsman or engraver, followed by Collins' failure to spot the mistake.

In Part 1 of the *Pilot*, on page twelve, he gave vent to some of the pressure he was under, in a shockingly unprofessional outburst that will nevertheless raise a hoot of recognition from any editor who has been tempted to do the same. Exasperated, a seething Collins inserted a caustic, three-line paragraph into the text: 'The Draught of the Severn is not so well finished as was intended, by reason the Ingraver lost the Original Copy.'

That particular chart does not bear an engraver's signature.

An experienced engraver could perhaps have proofread a copper plate, with its image and its lettering reversed, but Collins certainly could not. To judge from how much he spent on printing proofs compared to actually printing his atlas, a number of proofs were required for every page, not only for checking, but perhaps also for sponsors and dedicatees. In his invoice for the print and production of the *Pilot*,[22] Collins itemised his expenditure

in detail, from the layout and drafting of the charts themselves to binding the completed books:

Sixty maps designing	£180
Sixty copper plates at 24*s* per plate	£72
Sixty copper plates engraving, at £5 per plate	£300
For printing, and paper for proofs	£10
For printing five hundred books	£30
For printing maps for five hundred books	£62
For binding 500 books	£200

Another £250 was added to the list later, for paper. The figures are conspicuously rounded off. Including the small chart of Coquet Island that was placed within the text, there were forty-seven charts in a typical first-edition *Pilot*, plus three pages of coastal views, printed from a total of fifty-two copper plates. There was also the ornate single-page frontispiece, and some smaller pieces engraved with additions and amendments, such as the table of compass variations that he added at the end of his 'Preface to the Reader'. However, these extras do not amount to nearly enough to require eight more full-size plates, as Collins' invoice implies. It was probably not the first time, and certainly not the last, that an expense claim had been rounded up at the end of a publishing job to compensate for all the aggravation. At the bottom of the list, he could not resist adding one more line, as he remembered the shoe leather he had expended chasing around the streets of London between his draftsmen, engravers, printers and binders:

Charges and expenses in following tradesmen	£10

Production continued right up to the deadline. One of the *Pilot*'s charts was given major amendments at the very last minute, perilously close to publication. At the same time another completely new chart was drafted and engraved hastily. But this time the reason for all this frantic activity was not an engraver's mistake, or the carelessness of a draftsman, but William's war in Ireland.

William's Grand Alliance, formed to reinforce his Dutch Republic in its struggle with Louis XIV's France, gained a powerful new member as England and her navy joined Austria and Spain. But it was Ireland that went to the top of his to-do list once the deposed King James arrived there, landing at Kinsale in March 1689. For the most part the Scots had lined up with the English behind William, but James was still technically ruler of Ireland, and hoped to use the island as a springboard to get his Scottish and English kingdoms back. By mid-April the once and maybe future king had joined Jacobite forces at the siege of Derry. Meanwhile, there was a Catholic rising in Scotland, and the French landed troops in Bantry Bay. William was beset on all sides.

In an effort to contain the threat, he sent an army across to Ireland in August 1689, under the command of the Duke of Schomberg, who landed on the southern shore of Carrickfergus Lough,* captured Carrickfergus town after a short siege, and then marched south through the village of Belfast and as far as Dundalk. There he decided not to give battle, and set up camp. Waterlogged and unsanitary, the camp claimed the lives of thousands of Schomberg's men over the course of the winter. A battle might have been preferable.

The next summer William assembled an army of 16,000 at Chester. Greenvile Collins was waiting for him in the estuary, the *Mary* yacht shipshape and ready for sea, as soldiers were rowed on the tide down the shallow River Dee to a fleet of transports at anchor in 7-fathom water at

Hoylake. Escorted across the Irish Sea by a squadron of warships under the command of Cloudesley Shovell, the king and his forces arrived on the north shore of the Lough on 14 June 1690, Collins taking the *Mary* into Carrickfergus itself and anchoring beneath the walls of the castle. From the *Monk* third rate, Shovell sent his barge across to collect the king from the yacht and take him ashore. The army disembarked on the beach at Whitehouse, 5 miles to the south-west.

As William marched south through Belfast and joined up with Schomberg, James marched north from Dublin. They met on the banks of the River Boyne. The Williamite forces were better trained and better equipped as well as more numerous than James' army, although the outcome of the battle was never a certainty. William was slightly wounded by a cannonball, and Schomberg was killed. The Jacobite retreat was well conducted, and pursued none too vigorously by King William, who did not want to have to explain to his wife that he had killed her father. Once again James fled to France, sailing from Duncannon on 3 July. This time he did not return. The fighting continued in Ireland for another year.

The story of William's Irish campaign is told in Collins' charts. At the entrance to the River Dee, where William embarked his troops, Hoylake on Chart 30 is Hyle Lake, a useful deep-water anchorage in the channel between the Wirral Peninsula and the drying expanse of Hyle Sand. Collins surveyed the river while he was in the Irish Sea in 1686.

History would judge the neighbouring River Mersey's estuary to be a more useful harbour for shipping than Chester's River Dee, being narrower but deeper, with 10 fathoms at low tide off the castle at Liverpool. The silt in the Dee, by contrast, reduced the depth to a bare fathom at low water springs while still 5 miles short of Chester. In spite of its importance to the town, Collins' initial inclination might have been to ignore the Dee, as he had ignored various minor harbours on the south and east coasts that he felt

were used only by those with adequate local knowledge, but in fact he made a thorough survey of both estuaries, including their various off-lying shoals and sandbanks, and the muddy upper reaches of the Dee all the way up to Chester. His justification was straightforward: the mayor and magistrates of Chester had offered him 20 guineas for a decent chart of their waterway,[23] and he was happy to oblige.

For, by now, his great survey of British waters was becoming well known. Having decided long before the *Pilot* was published that it was never too early to get the word out, Collins prevailed upon Trinity House to start placing advertisements in the *London Gazette*. This one appeared in 1686:

> The Master, Warden, and Assistants of the Trinity House of Deptford-Strond, do give notice to all Masters of Ships, That whereas the Port of Fowy in the West of England, hath for some years past been accounted a Barr'd place, which did occasion Ships in bad weather (to the great detriment and loss of several) to shun the same; there is now at the Entrance into the said Harbour, not less than Three Fathom at Low Water; and it is accordingly so laid down by Captain Collins the King's Hydrographer, in the Draught thereof by him lately taken, to which they are referred.

Chart 30 of the Dee and the Mersey seems to have had several lives. Along with several other charts destined for the *Pilot*, individual, unnumbered copies were run off the press well in advance of the book's publication, and were available to buy separately. The date in the cartouche, and alongside James Collins' signature next to it, is 1689. In August that year, another advertisement appeared in the *Gazette*:

> There is now published by Captain Collins a new and exact survey of Chester-Water, Leverpool, Highlake, &c, where Their Majesties Forces are embarking for Ireland. Sold by Mr Lea in Westminster

> Hall, Mr Mordant at the Atlas in Cornhil, and Mr Fisher at the Postern-gate, Tower-hill.

Also published in 1689 were Charts 20, 29 and Q – the Scilly Isles, Morecambe Bay and the Moray Firth. Four others had appeared earlier: Chart S, of Orkney, came out in 1688, while Land's End and the Scillies, Harwich, and Burlington Bay – Charts 19, E, and I – bore the date 1686.

If Collins gave the worthy burghers of Chester a manuscript chart in return for their 20 guineas it is now lost, but the unnumbered, printed chart held by the city's archives is one of these very early versions, which must accord closely with Collins' original draft. At some point after this example of the chart was run off the press, and before publication of the *Pilot*, it was decided to send the plate back to the engraver for amendments, which included giving it a number in the top right corner, erasing the word 'sea' (and then 'land') in the latitude scale, and a few minor additions to the place names. Various settlements along the shore were awarded more trees and houses, along with more hills to enliven the landscape behind Point of Ayr. Two ships were engraved near the bottom, one flying the Dutch flag and the other the cross of St George. A new transit line appeared, marked 'AB': a continuation of a transit from Chart 29, which Collins refers to in his pilotage notes. On a scrap of drapery held up by two passing cherubs he added a note concerning the differing depths at spring and neap tides, and he also augmented the low-water soundings near the bar with additional high-water soundings. Collins explained that this technique, also employed in his surveys of Rye and the River Exe, was used only 'at such Places as there is not three Fathom at Low water'. It would enable masters of deeper-draught vessels to evaluate their prospects at a glance, without having to refer to the tide tables.

As William's troops were loaded aboard the transport ships at Hoylake, Collins saw to the monarch's creature comforts in the spacious stern cabin of the *Mary*. The king would have been even more taciturn than usual as they made the 120-mile passage across the Irish Sea, under the wing of Cloudesley Shovell and his frigate squadron, and into Carrickfergus Lough.

It was not a pleasure cruise. Just as James had had to contend with conspirators intent on overthrowing his Catholic rule, William governed initially in an atmosphere of suspicion and betrayal, knowing that some of his ministers were anxious to bring the old king back. He kept his cards close to his chest, trusting nobody but his faithful Dutch advisers.[24] It was little wonder that Collins found him a closed book.

But once ashore in Carrickfergus the king was in his element, striding about on dry land among soldiers, cannon, swords and muskets, issuing orders and consulting with his officers. Collins was able to leave him there, secure in the knowledge that having successfully discharged his responsibilities with the yacht, neither he nor the *Mary* would be needed again until it was time to carry William back to England. There was an obvious way to fill the time, which would also beef up the *Pilot*'s coverage of the Irish Sea: a survey of the Lough.

Although Collins' charts in this part of the *Pilot* were surveyed at different times, he numbered them to fit the narrative of William's campaign. Chart 29 shows the Irish Sea from North Wales to Galloway and includes the Hoylake anchorage, the Isle of Man, and the shoal water to the north-east of the island that Collins discovered and named King William's Sand. It is about 120 nautical miles from Hoylake to Carrickfergus Lough. After Chart 30 of the Mersey and Dee, where the army embarked, Chart 31 of the Isle of Man itself was probably also surveyed during Collins' 1686 season. He dedicated it to William Stanley, the Earl of Derby, who was Lord of the Isle and whose Lancashire Militia, raised at the request of the king, sailed with William's army and saw action at the Boyne.[25] Collins had probably met the earl before,[26] but he met him again during the campaign, and perhaps even hosted him aboard the *Mary* during the crossing. He certainly made a favourable impression, for the earl is listed among the *Pilot*'s subscribers.

In the top-right corner of the chart of Carrickfergus Lough, number 32, James Collins' cartouche is appropriately martial, with its porcupine of pikes, staves, halberds, swords, shields and gun barrels, while the allegorical figures of war and plenty place a laurel crown on the king's

head. The inscription reads:‘To the most Potent and Heroick Prince William the III of Great Britain France and Ireland, King, Defender of the Faith &c, This is most humbly Dedicated and Presented by your Majs most Dutiful and Loyall Subject & Servant Capt G. Collins.’

To the top left there is a panoramic view of the fleet’s arrival at Carrickfergus, showing Shovell’s flagship, his barge taking the king ashore, and the *Henrietta* yacht, chartered for the campaign by Prince George, William’s brother-in-law. In the centre of the picture sits the *Mary* herself, with the royal standard at her masthead, and flying an ensign as large as her longboat.

Collins managed to prevent these graphical celebrations of the king’s soldierly prowess from overshadowing the chart’s primary purpose as a navigation aid. The alignment of the Lough is on the correct bearing, its rock-strewn shores and off-lying islands plotted carefully. The distance across the water from Carrickfergus Castle to Gray Point is correct to within a cable’s length, and the bearing from the point to the island Collins knew as Crosse* is only about half a point out. Seven wooden beacons mark the deep-water channel up the Lagan estuary to Belfast. Plying the lead about a mile south by west of Carrickfergus Castle, he discovered a slight shallowing of the mud, at an awkward depth – 11/2 fathoms, with 2 fathoms all around it – which is now known as the Carrickfergus Bank.

Having taken care of the navigational content, Collins allowed himself a few extra embellishments. It was an ideal opportunity to flatter his new boss. Alongside the town’s castle, defensive walls and small drying harbour, he added the inscription: ‘Carreck-fergus King Will: Landed 1690.’ On the northern shore in the direction of Belfast, close to a wood, lies the beach where the army went ashore: ‘White house here K Will: Army Landed.’ At the village of Bangor, on the other side of the Lough: ‘Scomberg Landed 1689.’ And then there are the bonfires on the shore, dozens of them, depicting those that were lit on 14 June to celebrate the arrival of the Protestant monarch. They are everywhere. Number 32 is not just a good nautical chart, it is a cartographical history painting.

Carlingford Lough, number 33, is a half-plate chart on a single page of the *Pilot*, surveyed as Collins followed his king down the coast. William passed by well to the west, crossing the Newry River 5 miles inland at Newry Bridge on his way south, but the war still makes an appearance. The Battle of the Boyne was fought just 25 miles away at Drogheda, where Schomberg was killed. When Collins discovered a dangerous outcrop of rock[†] just 8ft down off Cranfield Point, he named it after the late duke.

The first edition of the *Pilot* also includes charts of Dublin Bay, number 34, and the unnumbered Kinsale. Collins might have found the time to survey these vital harbours while William was campaigning in Ireland, or he might have managed to get across the Irish Sea to do them during his 1686 or 1687 seasons. We do not know.[‡] They are both excellent, useful, large-scale studies with myriad soundings and detailed sandbanks, calculated to ease the anxious heart of any navigator making his approach. Collins dedicated the Kinsale chart to his old friend, patron and subscriber Sir Robert Southwell, who was born there, and who by this time was also King William's Vice Admiral of Munster and Secretary of State for Ireland.

Victory at the Boyne was by no means the end of William's tribulations. On the very day that his forces were battling the Jacobites, his allies suffered a serious reverse at Fleurus in the Spanish Netherlands. The day before, the French gave a combined Dutch and English fleet a bloody nose at the Battle of Beachy Head. And the previous summer, off southern Ireland, a French naval squadron escorting a fleet of transports to supply James' army had beaten off Admiral Herbert's ships at Bantry Bay. Whatever his difficulties with the disaffected Catholics in Ireland, the king needed no reminding that his most dangerous enemy was France.

William followed James' forces as they withdrew to the south and west, and although a detachment under John Churchill was able to capture Kinsale and Cork – where Collins' old pupil the Duke of Grafton was killed, aged 27 – William's army found Limerick a tougher nut to crack. He was out of time. Leaving the siege and the rest of the campaign in the hands of his Dutch general, Godard van Reede, he made for the little harbour of

Duncannon, in the Waterford estuary, where Collins had the *Mary* waiting, shipshape and ready for sea.

It was a brisk passage back to England in early September, blessed by favourable winds and choppy seas. Rather than heading south about Land's End and taking their chances with the winds in the English Channel – although William had been lucky there once – Collins headed straight across the Irish Sea to the River Avon, only 180 miles away. Shaving the cape to the south of Milford Haven as the tall mass of Lundy heaved over the horizon to starboard, the yacht and her escorts turned into the Bristol Channel and the tide carried them in past Flat Holm and Steep Holm. 'Keep nearest Flat Holme, which is the steepest side, you may sail close to it without any danger,' as he wrote in the *Pilot*.

Off the mouth of the Avon, Collins backed his topsail to bring the yacht to a standstill as Shovell's coxswain hooked on, and the king, anxious to be going, stepped down into the *Monk*'s barge. A huge royal standard broke out at its jackstaff, and as the men bent to their oars the flotilla anchored in 7 fathoms in a spot appropriately dubbed King Road. Just twenty-seven hours had elapsed since they set off from Duncannon Fort.

William spent the night as Southwell's guest at Kings Weston. It was some years since Collins had also been a guest at the big house, when he surveyed the peculiar cavern of Penpark Hole at the behest of its genial owner. He could never have imagined returning to the river in such circumstances, with a Dutch king on board the yacht, escorted by a flotilla of warships.

Collins probably never intended to produce a chart of the Avon itself, since there was no need for one: it was a famously fearsome stretch of water thanks to an outrageous tidal range, and in Collins' professional opinion a pilot was absolutely essential: 'The Tides rise here at a Spring 7 or 8 fathom,' he warned, exaggerating only slightly, and advising his readers to anchor, like he did, at King Road. 'But be sure when you anchor at High-water, that you consider how much the tides fall.' Brooking no dissent, he instructed: 'Here you take a Pilot to carry you into Hung-Road, and so up to Bristol.'

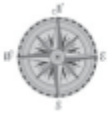
But a chart was most definitely needed now. The king had been carried into the river and put ashore at the slipway on the north bank, opposite the pilots' hamlet of Crockerne Pill, and Collins seized the opportunity to commemorate the occasion. The unnumbered, double-gatefold River Avon chart is one of the most attractive in the *Pilot*, dramatically illustrated with the Avon Gorge seemingly filled by a ship of the line, while the long, sinuous course of the river leads inland through wooded hillsides and the rocky gorge, into the heart of the city.*

Collins had previously paid little attention to the inland areas, and although he had thoroughly sounded the anchorage of King Road, the Avon chart shows not a single sounding in the river itself. The sea takes up comparatively little space on the right-hand side, but it is filled with ships firing salutes, while Shovell's barge, flying its outsize royal standard, rows William ashore. The slipway is labelled: 'Here King William Landed Septembr 6th 1690.' Collins dedicated the chart to Bristol's mayor, Robert Yate, who as master of the merchants hall in Bristol had probably lent him the map on which he based this rendition of the river, with its detailed street plan of the city. Yate only took office in May 1693,[27] which must have been uncomfortably close to Collins' production deadline.

The Avon's companion chart of the Severn and Bristol Channel can be found in the *Pilot*'s preceding pages, showing Sir Robert Southwell's house and coat of arms. This had probably been drafted and perhaps even engraved long before, and major amendments had to be made to mark the royal visit. From its slightly lopsided layout it looks like both the scale and Sir Robert's dedication had to be moved to make room, bottom right, for Collins' inset view of the anchorage, shown packed with the ships of the royal fleet as the king is carried ashore. A caption along the top of the illustration reads: 'At Shere Hampton near King Road, landed his Majtie on the 6th of Septr 1690 he sailed in 27 hours from Duncannon Fort to King Road and lay that night at Kings Weston at the house of Sr Robert Southwell.'

Dominating the foreground of the scene is the *Mary*, her topsail still backed. There is a figure standing on her quarterdeck, pointing towards the

royal barge. It can only be Collins himself.



Collins was captain of the *Mary* from March 1689 to November 1693, when he was given command of the slightly bigger and slightly newer yacht *Fubbs*. She was built in 1682 for Charles II, who called her after his pet name for his mistress, Louise de Kérouaille, Duchess of Portsmouth.

Endeavouring to finish the *Pilot* and get it ready for publication while also being at the beck and call of King William and his ministers tested Collins to his limits. The project was entirely his own. He was not just the surveyor, but also the captain and navigator of the survey ship. He was his own writer, editor, proofreader and production manager. For long periods during the *Pilot*'s protracted gestation, he also had another job: yacht captain to the king, which allowed him precious little time off.

When it eventually came out, *Great Britain*'s *Coasting Pilot* was a mighty and impressive tome, more than 20in tall and some 27in across when opened out to display its charts.* It was far from perfect, as Collins well knew, and it wasn't even finished, if the gaps in his numbering are anything to go by. It is impossible to know how he felt when he saw the first pristine copies, fresh from the binders, stacked up in Richard Mount's shop in the Old Postern, but it would be surprising if he was not shot through with a well-deserved glow of pride.

He had done something new. The *Pilot* offered information that navigators could not get anywhere else. Charts like those showing the broad expanses of the North Sea or the Irish Sea, useful for passage planning, had long been available from the likes of Seller, or from Dutch publishers. What made the *Pilot* invaluable was its larger-scale charts, showing approaches to harbours, rivers and anchorages at a reassuring level of detail. Mariners who until then would have had to rely on hearsay, on notes scribbled down during conversations with more experienced colleagues, or on copied

manuscript charts of doubtful provenance, now had access to clear, reliable charts based on professional surveys.

Some purchasers of the *Pilot* were able to customise their individual books, as we have seen with Samuel Pepys, who was a map and print collector as well as an influential naval official. He had two Robert Morden maps added to his. Another early example of the *Pilot* included a Philip Lea map of England.[28] But most copies of the original 1693 edition, the only version for which its author was responsible, seem to have followed the same overall pagination. Collins was granted his licence to publish on 22 February 1692, and the *Pilot* finally went on sale in March the following year.

The imposing leatherbound volume opens with a huge baroque frontispiece dominated by the royal arms, top centre, flanked by trumpeting cherubs. The king and queen are represented as Poseidon and Britannia. On the title page opposite, printed in red and black, Collins set out his stall. The first edition of the *Pilot* was divided into two parts, and on this page he referred to his chart coverage in England, going on to claim that his atlas included 'All the Harbours, Rivers, Bays, Roads, Rocks, sands, Buoys, Beacons, Sea-Marks, Depths of water', as well as latitudes, distances and bearings, and tidal information. He added in smaller type: 'With Directions for Coming into the Channel between England and France.'

The biggest word on the page, on its own line in red capital letters, is 'ENGLAND'. In making such assertive claims for his *Pilot*, Collins had in mind his competition. The frontispiece of John Seller's *English Pilot*, for example, which dated from 1672, was similarly hyperbolic in listing 'sea coasts, soundings, headlands, sands' and more, with courses and distances, tides and currents, all supposedly, 'gathered from the latest and best discoveries that have been made by divers able and expert navigators of our English nation'. Seller, too, had been allowed to style himself 'Hydrographer to the King'.

But compared with Collins' work, Sellers' various atlases were entirely lacking in focus, their coverage jumping about from place to place and even country to country according to whatever material their publisher happened

to be able to lay his hands on. Collins' *Pilot* was different. It was the first modern pilot book, and offered, for the first time, a coherent set of charts which were of real, practical value to the coastal navigator in British waters. In promoting his atlas, Collins had to banish any possibility of confusion between rival efforts and his own. To the long list of unfamiliar trades that Collins had to master in the production of his atlas, he could now add that of copywriter.

His text sections included tables of courses and distances between harbours and headlands, in leagues and miles, accurate to within half a point, to help the navigator with passage planning. His tide tables presented their vital information in a new and much clearer way than had been seen before,[29] showing the time of high water both in hours and minutes, and according to the position of the moon, during periods of 'full and change' – full moon and new moon. They also stated the heights of tide at the various harbours, and the directions of the tidal streams during the flood and ebb.

The chart coverage of the first part of the *Pilot* took the reader around the south coast of England and up the Irish Sea. It culminated with Plate 39, a double-page set of coastal views showing prominent landmarks as they appear from the sea, starting with the white cliffs of the South Foreland in Kent and ending at the lighthouse of St Ann's Head at the entrance to Milford Haven. The second part of the *Pilot* had a title page of its own, 'Being a New and Exact Survey of the Sea-Coast of England and Scotland, from the River of Thames to the Northwards, with the islands of Orkney and Shetland', followed by its text and charts, and another page of coastal views.[*]

After the first title page came Collins' salutation to the king, dedicating the entire work to William, from 'Your Majesty's Most Faithful Subject and Servant, Greenvile Collins'. Over the page, beneath another royal coat of arms, the king and queen acknowledged that their 'Trusty and Welbeloved servant' had laboured long and hard to produce the *Pilot*, and now 'hath humbly besought Us to grant him Our Royal Licence for the sole Printing and Publishing thereof, We have thought fit to condescend to that his Request'. This was Collins' security in the age before copyright law, giving

him a term of fourteen years of protection from pirate printers and plagiarists. It was signed on the king's behalf by Sydney Godolphin, who as First Lord of the Treasury was also one of the *Pilot*'s subscribers. The equivalent Dutch licence occupied the next two pages, in Dutch, granting him fifteen years of copyright protection in the States of Holland.

Collins then offered his gratitude to Trinity House for approving his proposals for the survey. He presented his book for their 'protection and patronage', and made so bold as to suggest that navigators in future ought to present their journals to the Brethren for inspection, so that new 'observations and discoveries' might further the cause of safe navigation.

Between his address to Trinity House and a two-page list of the *Pilot*'s subscribers, Collins placed his Preface to the Reader. It addressed 'my Fellow Mariners of Great Britain', and outlined the author's sole intent to provide sailing directions for the country's coastline, 'and how to carry a Ship into any Harbour, River, Port, Road, Bay, or Creek with safety'. He lamented the 'too frequent' shipwreck of richly laden vessels returning to their native shores, to the impoverishment of merchants, owners and mariners alike. This was not the fault of the ships' masters. Far from it: 'All our Neighbours will acknowledge that no Nation abounds more with skilful and experienced Seamen than our own, none meeting a Danger with more Courage or Bravery; none taking more care.' But no master could possibly know every harbour, he conceded, and it also sometimes happened that over the course of a long voyage the master may die, depriving his shipmates of his vital knowledge and experience. 'In such Cases, and to such Persons, this Survey will serve in the room of a Pilot.'

He could not resist climbing into his pulpit to extol the virtues of that nautical paragon, the ship's master:

> As many Ships are lost by Ignorance and Negligence, as by stress of Weather, so a Master of a Ship hath a very great Charge, and ought to be a sober Man, as well as a skilful Mariner: All helps of Art, Care, and Circumspection are to be used by him, that the Lives of Mariners (the most useful of their Majesties Subjects at this

> Juncture) and the Fortunes of honest Merchants under his Care, may be preserved.

Promising that there would be additions and corrections to the *Pilot* in the future, he signed off:

> Wishing you always happy and successful Voyages, and safe Returns, with Prosperity to the Nation and its Forces by Sea and Land, that we have been hitherto, so we may even be at home Soveraigns of the Seas, and Umpiers of the Differences betwixt our Neighbours abroad, which as it is every good man's Wish, so it is the constant hearty Prayer of Greenvile Collins.

Throughout the survey, and the production of the *Pilot*, Collins struggled with money. Payments were made, but intermittently. He received £100 from the Admiralty in March 1682, but had to wait until April 1683 for the king's promised subscription of £200. By that time, Collins explained, he had already spent £500 on the survey, most of it borrowed, and 'was daily threatened with arrest'.[30]

In the crisis year of 1688, when the *Cleveland* yacht bumped alongside the *Resolution* on 24 October in the Gunfleet anchorage, delivering the mail to the irresolute Baron Dartmouth and the flagship's other officers, Collins opened a letter from his wife Elinor to find that Sir Richard Haddock, Comptroller of the Navy, had been in touch. He did not sound pleased. So, as Dartmouth was sending the *Cleveland* yacht back into Harwich with letters for London, Collins took the opportunity to add one of his own.[31] 'Honored Sir,' he wrote to Sir Richard:

> This is to returne you ten thousand thanks for your care in my business. My wife writ mee that you tould her that you were not satisfyed in the instruments wch I charged the king with, I have here sent you the particulars what they cost, besides my charges in getting them made.

And he itemised his expenditure again: £60 for the 5ft quadrant, £12 for the small quadrant, another £12 for the theodolite, £6 10*s* for the Davis quadrant and brass staff, and lesser sums for the chains, compasses, measuring wheels and 'other small surveying instruments'. 'The late king promised mee that I should be paid for them,' he added, explaining that they would not be worth half of their purchase price if he were to try and sell them. He needed the money not just for 'the finishing my mapps for the publick good', but also for 'the happyness of mee and poare wife and children'. He was disconsolate, and claimed to regret ever suggesting the survey: 'I wish I had never been put upon it, since it hath had such bad fortune. What you doe in this you will constantly have the prayers of mee and mine for happyness.' He signed off with, 'Your most obedient humble servant, G. Collins', and addressed the letter from, ' *Resolution* at the Gunfleet'.

Perhaps this plea from an officer engaged on the king's business during a time of grave national crisis was enough to melt Sir Richard's stony comptroller's heart, for we hear no more of this particular invoice.

But long after he had finished the survey, and even after the publication of the *Pilot*, Collins was still trying to lay his hands on other money he was owed. King Charles, his most important patron, was dead. James had fled, and William III had bigger fish to fry. With no power and little influence, Collins and his family were running on fumes. Elinor was almost constantly pregnant, and by 1692 they had six surviving children. In a petition to the Navy Board in 1693 for 'wages and travelling expenses', he closed his appeal with an attempt at wit that did little to conceal to his desperation: 'that I may not be Shipwrecked for having laboured hard to prevent Shipwrecks'.[32]

But at this point he was rescued by another powerful patron. Sir John Lowther, baronet, Member of Parliament for Whitehaven, and Admiralty Commissioner, was an enthusiastic supporter of Collins' survey. He subscribed to the *Pilot*, and Collins had dedicated to him Chart 29, the eastern Irish Sea from Anglesey to the Mull of Galloway, including the Isle of Man, which was among the first to go to press. Naturally, the port of Whitehaven is marked clearly, close to the cartouche: 'To the Honourable Sir John Lowther, Baronet, one of the Commissioners for Executing the Office of Lord High Admirall of England. 1689.'

When Collins' latest petition arrived on his desk from the Navy Board, with its itemised expenditure endorsed by the officials – 'which he affirms was promised him by the King, and the then Lords of the Admiralty at his entering upon the R[oyal] service'[33] – Sir John responded in clear, forthright terms. 'Whereas you have represented to us by your letter of the 23rd of September last,' he wrote on 12 March 1694, 'that Capt Greenville Collins, claimes the summe of one thousand nine hundred and fourteen pounds, tenn shillings, for taking a survey of the Sea Coast of this Kingdome, on which he was employed by the direction of his late majesty, King Charles the Second.'

He lists the particulars: £40 for instruments, £80 for manuscript charts, no less than £1,400 for seven years of travelling expenses, and £394 10*s* 0*d* for his captain's wages. The total came to £1,914 10*s* 0*d*. 'In consideration of the usefulness thereof to Navigation in general, as well as their Maj Navy in particular,' Sir John directed, 'he ought to be reimbursed his sayd charges.' But because by this time Collins had received £500 from the Commissioners and the Treasury, 'wee doe therefor hereby desire and direct you, to cause to be payd unto the said Capt Greenville Collins the sum of fourteen hundred and fourteen pounds ten shillings, which is what remains'.[34]

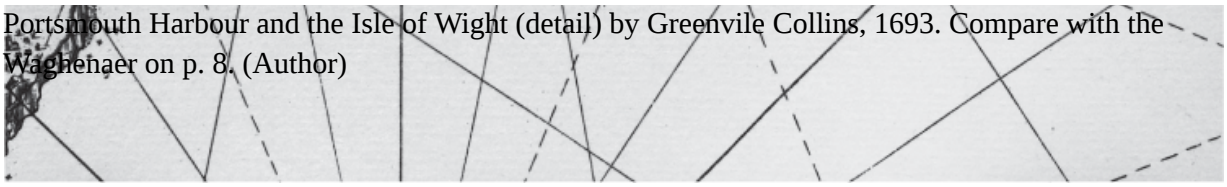
After years of pleading and piecemeal payments, all it took was one letter from a knight of the realm. But it was a little late. Within a fortnight, Collins was dead.

He died on 23 March 1694, of an unknown cause. There is no shortage of possibilities. London was not a healthy city. Smallpox was rife, typhus and typhoid claimed thousands, and tuberculosis was endemic. Ships and yachts were also dangerous places to work. A halyard parts, and a heavy spar crashes down on deck. A moment's inattention by a deckhand, and the longboat slips from its pulley. A wave, steeper than the rest, causes a headlong tumble down the companionway.

But most accidents happen when you are doing something so commonplace it hardly seems to warrant your attention. It was March, probably cold, possibly frosty, with strong tides running in the river, and it may have simply been that Collins, in a hurry as always, clambering down into the boat, slipped on the icy gunwale and hit his head as he went in. By the time he bobbed up and the crew could react he was out of reach, carried many yards astern by the tide. In his heavy coat and sea boots, he would have drowned before they could get to him.

The navy's record of his passing is an unsentimental 'DD' next to his name on the *Fubbs*' muster roll: discharged, dead.[35] He was 51. Elinor buried him at St Margaret's, Westminster, where they had christened all but one of their children.

Fareham
Hill
Beacon
Little Chalk pit
Great Chalk pit
Porchester Castle
Palgrave
Wimerin
Farlington
Portsea bridge
Bedhampton
Elmer Arth
Milsey
PORT
Kingston
SEA
Gamer pond
Gosport
Stoke
Kings Docks
Baseland
Langston
Haven
HALING
Wood
PORTSMOUTH
Milton
LAND
Hayling Island
Stoke Bay
Southsea Castle
Spit Sand
Spit Head
Ryde middle
Dean
Horse
Bury
Dry
Wmary Land
Dark dry
Warner
St Helens Road
Square End
St Helens Point
St Helens Church
St Helens Lake
Brading
Bembridge Point
Chalk Pit
Beacon
Sandown Bay
Sandown Castle



Portsmouth Harbour and the Isle of Wight (detail) by Greenvile Collins, 1693. Compare with the Waghenaer on p. 8. (Author)

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* The king's pilot was Janzs Hartevelt, who had been aboard the Dutch flagship *Den Briel* during the Glorious Revolution. [PhD dissertation, John M Stapleton, Ohio State University, 2003.]

* According to the cartouche.

† Chart 14 was one of those signed by John Harris, although that does not necessarily mean he also engraved the cartouche. Chart 16 is not signed. The engravers' confusion was perhaps compounded by the fact that Arthur Herbert had also served as one of Plymouth's MPs for the few weeks of William's Convention Parliament.

* Plain to see in the Guildhall Library copy. The plate was later re-engraved, according to Verner.

* Now known as Belfast Lough.

* Lighthouse Island.

† Hellyhunter Rock.

‡ According to Collins' schedule, published in the 1693 edition of the *Pilot* on p. 24, he surveyed Carrickfergus, Dublin, Kinsale and Cork in 1687. The lack of any references on the Dublin chart to William's war supports that. However, there was no Cork chart in the first edition of the *Pilot*, and the one that appears in later editions is not by Collins. He also makes no mention in his schedule of surveying Carlingford. Hughes (p. 130–6) suggests that he surveyed the English side of the Irish Sea, plus Dublin, in 1686, and then surveyed the Isle of Man and the remaining Irish ports during the Williamite war in the summer of 1690. I suspect that the Isle of Man survey is actually from 1686 or 1687, as it is hard to imagine Collins having the time to do it during the war. The discrepancy is strange. Collins wrote the schedule five or six years after the event, so his memory might have been at fault. Or he

might have been trying to keep things simple, while making himself look as efficient as possible, to safeguard his expenses claims.

* Collins perhaps never actually made it upriver to Bristol himself. If he had, he would surely have thought to mention in his sailing directions that the city used specially trained swimming dogs to take ships' mooring lines ashore. [Millerd's map of Bristol, 1671, via bristolmuseums.org.uk]

* The first edition of the *Pilot* was produced in two sizes, thanks to slight differences in the stocks of paper used. [Hughes p. 166] The printed areas are of course the same, and the difference can only be discerned by comparing one size with the other, as, for example, in the two 1693 copies held by the British Library. In the smaller one (Maps 13.Tab.11) there is a very noticeable difference in paper quality between the text pages and the chart pages. Its charts are quite badly discoloured.

* Post-1693 editions of the *Pilot*, after Collins' death, did away with the conceit of its being in two parts, and the title page was rewritten accordingly. The text was reset and compressed, as forty-seven pages (ninety-four columns of fifty-nine lines) became twenty-six pages (fifty-two columns of eighty-seven lines). The type for the crossheads was also changed from Blackletter to Italic.

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Epilogue

Turkish Carpets and a Silver Watch

I have for these 10 years past employed myself in making a new and exact survey of Great Britain's sea coast, which I hope will prove useful to navigation, especially to England and Holland, which nations may God Almighty prosper by sea and land.

Greenvile Collins to Nicholas Witsen, 10 June 1691[1]

Greenvile Collins is hardly a household name, but he has always been an important figure in the hydrographic and cartographical worlds. Copies of *Great Britain*'s *Coasting Pilot* grace the shelves of academic libraries and public collections throughout Britain, Europe and North America, and even occasionally come up for auction, where they can command impressive prices.

All of the individual Collins charts to be found on the market today are sliced out of copies of the *Pilot*. Any that were sold separately by the publisher would have probably been for use on board ship, and would have become worn out, damaged, and eventually lost or discarded. The *Pilot* itself was expensive. Wealthy sea captains might have taken theirs on voyages with them, but many copies were also probably sold to institutions, collectors, and map enthusiasts such as Samuel Pepys.

The *Pilot* is an enormous and unwieldy volume, whose bindings have often struggled, down the years, to hold on to their precious pages. Faced with the choice of expensively restoring the book, or breaking it up to sell the charts individually, any map dealer who has acquired a complete but

shabby copy has a fairly easy decision to make – easy, at least, for anybody trying to make a living selling maps.

The *Pilot* remained in print for many years. Freeman Collins published the first edition in 1693, with its fourteen years of copyright protection granted by royal privilege, and a print run of 500. Had Greenvile lived, he would no doubt have had his cousin reprint the *Pilot* periodically with amendments, additions and corrections. It seems clear from his eccentric numbering system that he intended to fill in some of the gaps in its coverage, and he would have wanted to continue the survey up the west coast of Scotland. He had also been granted a fifteen-year Dutch copyright, and although there was never a Dutch edition of the *Pilot*, it indicates his ambition.

But perhaps after some initial enthusiasm sales were sluggish. With no author to lobby on the *Pilot*'s behalf, Freeman Collins seems to have found plenty of other things to be getting on with, and at some point he sold the plates to the distributor, Richard Mount at Tower Hill, whose company Mount & Page produced numerous subsequent printings of the *Pilot* from 1723 until 1792.

So there are plenty of Collins charts out there. Most good antique map shops in the UK probably have one or two squirrelled away. A map dealer who has broken up a *Pilot* into its constituent charts will know their age, because all editions of the book were dated clearly on the title page. For charts acquired individually, already separated from their bindings, it is not always easy to determine which edition they came from. Some of the plates were refreshed once they started to show signs of wear, and others were amended and corrected at various times. All later versions of the *Pilot* published by Mount & Page lack the two impressive English Channel charts that appeared in the first edition, and to replace them the publishers introduced a new chart of the Channel by the astronomer and scientist Edmond Halley. This is included in every *Pilot* from 1723 onwards, and features, for the first time, a graphical representation of the time and direction of the tide at various locations. It also, incidentally, places the Isles of Scilly too far north.

Other charts by other hands were added to the *Pilot* from 1723. They include a useful one of the Downs, surveyed by a Captain Nunn, and an unnumbered and anonymous chart of Cork Harbour, in which, rather unexpectedly, all the soundings are in feet. Revised versions of both of these can also be found in later editions, as can a new chart of Plymouth Sound by Samuel Thornton, another chart of Portland, and yet another of the central south coast of England, surveyed 'by Order of the Government' by one Jos Avery.

Samuel Pepys was famously hard to impress. He didn't rate the *Pilot* very highly when it came out, although his opinions seem mainly to have been founded on the gossip that surrounded its publication after such a lengthy gestation. The print and map-makers of London were close-knit and competitive, and the sudden appearance in their midst of this disruptive sea captain, who had the temerity to publish his own great sea atlas, must have put a few noses out of joint. A Mr Hunter whispered to Pepys that 'Trinity House itself complains of Collins' ill performance of his Book of Carts; and yet he dedicates it to them as well as to the King'.[2] A Mr Tollett cast some aspersions that Pepys couldn't quite remember, but he recalled 'suspicions of the generality, of Captain Collins' performances'.[3] When Mr Lea the map and globe-maker bustled in to Pepys' apartments to show his valued customer some drafts, he took the opportunity to mention problems with Collins' work. 'Lea also tells me that Collins has made use of one Mount, a bookseller, for his partner in the charge of graving his charts, and not a chart-maker,' Pepys noted. 'By which he saith that he believes they come to be so imperfect.' Lea's desire to tarnish Collins' reputation was apparently personal, perhaps motivated by professional jealousy, and possibly malicious, for immediately after the globe-maker's visit Pepys made a note to himself: 'In order to my better judging of Colling's new work, enquire after his sobriety.'[4] If the charts were so imperfect, one wonders why Lea also felt it necessary to slander their creator.

However, Pepys was not a gossiping fool, or not entirely, and he tended to blame the atlas' perceived imperfections not so much on Collins as on the difficulties he had had to contend with in producing it, especially regarding

money. Pepys also felt that the survey had been too much for one man to take on alone, and that Trinity House ought to have shown greater interest in the project and lent him more support. Collins was, after all, one of the institution's Brethren.[5]

But Pepys nevertheless asked the respected chart-maker and retired sea captain John Thornton to compare Collins' *Pilot* with a Waggoner, and also with a new French sea atlas, just out, called the *Neptune François*. Thornton could have told him that these foreign productions were all very well if you wanted an attractive collection of charts for your library, but if you needed detailed coverage of British coastal waters, there was no contest. In merely asking the question, Pepys showed that he did not understand the significance of the *Pilot* as an aid to navigation, and could not see what would have been so obvious to any seaman: how clear, focused and practical Collins' charts were, particularly those illuminating the approaches to individual harbours, and how helpful and thorough were his pilotage notes. 'Note how soon the Dutch have copied the French Neptune, and not his,' Pepys added to himself as a disappointed afterthought, perhaps also not appreciating that the two pages of dense Dutch in the front of his own copy of the *Pilot* lent Collins copyright protection against Dutch plagiarists, who in any case might not have felt brave enough to steal from the man who had so loyally served their own sovereign Stadtholder. Pepys' opinion of the *Pilot* was guided by the opinions of others. For him, to have it copied by the Dutch would have been the ultimate accolade.

Navigators made up their own minds. As the years went by, with nothing better to replace it, the *Pilot*'s reputation grew. The British Library has a volume of bound manuscript logbooks containing the work of at least two authors on two different merchant ships, the *Panther* and the *Mary Bonaventure*, dating from between 1700 and 1704.[6] Their voyages mirror some of those made by Collins, from the south coast of England to the trading ports of Spain and the Mediterranean. Along with some carefully transcribed tide tables taken from the *Pilot*, one of the captains has copied out, word for word, on three closely written pages headed 'Some observations taken out of Capn Collins his Coasting Pilot', Collins' advice

for negotiating the tricky inshore waters around the Isle of Wight – East Barrow Heads, the Owers, Noman's Land, and of course St Helens, with its tricky tides, where 'In little Wind or Calmes you shall be drawn in here to Admiration, by the strong Indraught, which if you find, anchor in time'.

Sound advice, heeded closely: it was exactly how Collins intended the *Pilot* to be used. And as late as 1771, Captain Barkley of the fourth-rate HMS *Salisbury* was using his copy of the *Pilot* on a daily basis. In the column headed 'Descriptions For Sailing in and out of Ports, &c' in his Remark Book, he simply wrote, repeatedly: 'See Collins Coasting Pilot'.[7]
A bootleg copy of the *Pilot* did appear, eventually, published in France by Jacques Nicholas Bellin. There were other copies too. Similarities have been discerned between Collins' Kinsale survey and one published by John Seller. Before the publication of the *Pilot*, one Thomas Dineley, an antiquary who was presumably known to Collins, borrowed the draft of Milford Haven for his book about the Duke of Beaufort's travels through Wales. The duke became the chart's dedicatee and subscribed to the *Pilot*, so Collins seems to have gained most by the exchange. Soon after the *Pilot*'s publication, one courageous Dutchman, Hendrik Doncker, put his head above the parapet and copied Collins' chart of the east coast of Scotland, but he credited only John Marr, not Collins.

Years later, Collins did finally get the back-handed compliment of a Dutch copy of his atlas, by Gerard van Keulen.[8] Pepys would have applauded.

Collins certainly wrote many more journals than the surviving four upon which much of this book is based. His career was unusually busy and varied even by the standards of the times in which he lived, and it would be a privilege to read in his clear prose and elegant handwriting an account of the Battle of Solebay as seen from the deck of HMS *Triumph*, or the story of his Far Eastern voyage with the East India Company. If he also served

with the Royal African Company, as some believe,[9] a journal from that period of his life might have offered some disquieting insights into the early days of the British transatlantic slave trade. But unless one of these journals comes to light in some hitherto unexplored country house attic or underfunded provincial archive, we will just have to make do with what we have.

At the time of writing, Collins' Arctic journal is lodged with an antiquarian bookseller in New York, where it has been for many years. The asking price is enormous. It is quite safe and well looked after. If it seems extraordinary that such a jewel from Britain's maritime history should find itself at the mercy of the market, then an annotation at the top of the title page of Collins' Mediterranean journal might put things in context: 'This book bought off a stall in Moorfields th. year 1774 for 6 shillings, and presented to Rear Adm Man. Left by him to Captain Robert Man.' Captain Man took it down to Plymouth and in 1788 passed it on to a friend named Williams, and from there it was passed from hand to hand and down the generations until, thankfully, it was presented to the Public Record Office. Today it is available for study at The National Archives in Kew, south-west London.

The fact is that in its day, a Greenvile Collins journal would have been no more highly prized than any other officer's, and once out of his hands its survival would have depended as much on the whims of Admiralty officials, clerks and storekeepers as it did on the fires, floods and bombs that fate seems to inflict on all archives from time to time. After 350 years, the survival of as many as four of Collins' journals actually seems rather remarkable.

The *Leopard* journal can be viewed in the spacious and elegant reading room of the National Library of Wales, but how it came to be there is something of a mystery. All the librarians can say is that it was deposited in 1957 by the Reverend Elias Hughes of Blaenau Ffestiniog, and what he was doing with it we will probably never know. The Revolution journal, produced during a time of constitutional chaos and state confusion, almost certainly never made it up to London for perusal by the king or the Lords of

the Admiralty, and remains to this day the property of Baron Dartmouth's descendants. However, along with the rest of Dartmouth's papers, it is held in the archives of the Caird Library at the National Maritime Museum in Greenwich.

By contrast, quite a number of copies of *Great Britain*'s *Coasting Pilot* have survived. Some are in private hands, many others are held by various institutions around the world, and there are several in public collections. Some thirty-four copies have been traced from the first print run of 1693 – the only edition produced during Collins' lifetime.[10] The Caird Library has one of these, along with seven other copies of various dates. Of the first editions, the one held by the Guildhall in London is a particularly fine example, but the king's copy, so called because it came from the library of George III, is perhaps the most impressive of all, thanks to its beautiful hand colouring. It, too, is kept in London, at the British Library.

Collins' probate inventory has been preserved in The National Archives: a tiny, fragile scroll that is difficult to decipher but suggests that in spite of his debts and struggles to get paid, he and Elinor were living in some style when he died.[11] According to the baptismal records of their children, at some point after February 1689 they moved from Westminster to Deptford, to be closer to his work as the king's yacht captain.

Their house there had two garret rooms in the roof for the servants, who appear to have slept in 'sea beds' – hammocks or cots, slung from the rafters – and there were three bedrooms on the first floor. Greenvile and Elinor's bedroom had a French bedstead, a table, six chairs and a couch 'covered with old Damaske', along with a walnut chest of drawers and two mirrors. There was a longcase clock on the landing. 'Ye little fore roome' on the ground floor was his study, containing a table and four old chairs, some shelves and his 'mathematticall instruments and books'. In the parlour they had a mirror with a walnut frame, and two 'weather glasses'. The

dining room, which could seat twelve, was decorated with Delftware, pictures, prints and maps, and furnished with two large carpets that Collins probably brought back from Turkey. This was also where he kept his arsenal of weapons: two fowling pieces, two carbines and four pistols. His swords, one silver and one steel, are listed along with his silver watch and two luxury items belonging to Elinor, gifts from her husband: a muff, and something indecipherable but expensive, made of beaver pelt – perhaps a stole. At the bottom of the document, the newly widowed Elinor added her tentative and untutored signature.

Glimpses of Elinor in the archives are few, and get fewer after Collins' death. She was 39 when he died. It might be that she was the Elianor Collins, widow, who married 36-year-old Patrick Russell, mariner, on 24 November 1696. They are recorded as living in Bishopsgate.[12] Of the Collins children, only faint traces remain. Their first, Isabella, was born and died while Collins was away on the *Leopard*.[13] Next came Barbara. She survived, for there is a record of a £100 investment made for her in 1693, when she was 11, in a 'tontine' – a sort of life insurance policy set up to help the king raise money for his wars.[14] America, their sixth, died very young.[15]

Two of the boys, Greenvile and James, appear on the muster lists of the *Mary* and *Fubbs* yachts as Greenvile's servants. Greenvile, aged 9, remained aboard the *Mary* when Collins was moved to the *Fubbs*, but 6-year-old James went with him. Both boys' wages and the money owed to her late husband were paid to Elinor.[16] It seems Collins was preparing his boys for a naval career. Few fathers were better connected. He could have introduced them to the king.

On an ever upward social trajectory, Greenvile Collins came from a small town in north Devon, went to London, joined the navy, studied hard, and gained the confidence of lords and kings. By the end of his life, he was

anxious to turn his professional recognition and success into something tangible. Money was one thing, certainly, and Collins had to believe that at some point he would be paid what he had been promised, even if the regime had changed twice since he first received those assurances from King Charles. The title of Hydrographer to the King was also gratifying, and to have it printed prominently on the *Pilot*'s title page, and engraved on virtually all of its charts, would have been a source of great personal satisfaction, as well as an aid to sales.

But in seventeenth-century England, true consequence only came from land. To own an estate and live off its rents would make him a gentleman, not only putting him on a less unequal footing with most of the senior officers and officials he had to deal with, but also providing more security for Elinor and their children. Of course, he had no money to buy land, but there was another option: the gift of a manor. Through this late vestige of the English feudal system, he could seek the honorary grant of a rural estate, which – although owned by the king – would allow Collins as its 'tenant-in-chief' to profit from the rent and services of his sub-tenants. Such estates could be extensive, comprising sometimes widely separated farms and villages, as well as parcels of land specifically for the use of the lord of the manor. Some came with a title. People would have to address him as 'Sir Greenvile'.

It was worth a try. Tipped off, perhaps, by family connections in the West Country, he applied first for a vacant manor down their way that looked a likely prospect. The Calendar of Treasury Papers contains this undated record:

> 36. Petition of Greenville Collins, captain of His Majesty's yacht the Mary, to the King; praying the grant of a lease, for 31 years, of the manors of Shepton Mallet, Curry Mallet, and Meer, with the reversion of the manor of Inglecomb, in the county of Somerset.

Nothing came of that one. He tried again in January 1693, this time for a manor forfeited by James II that comprised an old castle, mature woods, a well-stocked fish pond and 200 acres of prime English countryside:[17] 'Petition of Greenvile Collins, captain of the King's yacht, the "Mary", addressed to the King, praying for the grant of a lease of the manor of Reigate, in Surrey, for 99 years.' That, too, was turned down, with a lawyerly note attached: 'My Lords do not think it for His Majesty's service to grant a lease of this manor.' It went a few years later to one Joseph Jekyll, who soon became Sir Joseph.

That is almost the last we hear of Greenvile Collins. It seems he was eventually paid all the money he was owed, and a year after his death Elinor was granted an additional sum in recognition of her late husband's services. Again it was Sir John Lowther who signed the authorisation, on the orders of King William:

> In pursuance of his Majs pleasure signifyd to this board, we doe hereby desire and direct you to cause the sum of five hundred pounds to be forthwith paid to the widdow of the late Capt Greenville Collins … in consideration of her said husbands great care and pains in surveying the coast of this kingdome, and of his other good services, in attending the kings person, in the passages which his Majesty has taken, to Ireland and Holland.[18]

Although Lowther's letter barely hints at them, Collins' 'other good services' included his time as master of the *Resolution* in 1688, when he played his part in engineering the constitutional upheaval that would soon come to be known as the Glorious Revolution. His contribution is easily overshadowed by the claims of those with nobler names and greater influence, whose stacks of letters and sheaves of documents tend to fill the historical archives. Collins made no overt claims for himself, but in the transparent prose of his 1688 journal, he invites us to understand his crucial role in helping to change the course of history.

Let one of Greenvile Collins' contemporaries have the last word. Joel Gascoyne was one of the great map-makers of the age, whose survey of the county of Cornwall set such a high bar in English cartography that it was not surpassed for more than a century. He was the son of a Hull sea captain, and began his professional life as an apprentice in the Thames School of manuscript chart-makers. He set up on his own in 1675, in Wapping, and soon made a name for himself. He did important work for John Seller, made a celebrated printed map for the governors of the Province of Carolina, 'with its Rivers, Harbors, Plantations and other accomodations', and came to the notice of Samuel Pepys.

He and Collins would have known each other. And they would have had plenty to talk about. Before he received the Cornwall commission, Gascoyne had been employed by Collins' neighbour at Deptford, John Evelyn, to survey his Sayes Court estate. Then he got a job from the king to survey some land at nearby Greenwich, with a view to building a naval hospital there. And if the two surveyors didn't meet down the river, they would certainly have done so in the print and engravers' workshops up in town.

Six years in the making, Gascoyne's great map of Cornwall was not published until 1699. As a land surveyor he had the usual problem with the Isles of Scilly, which was that, although they were a part of Cornwall, they were nevertheless 25 miles out into the Atlantic, and barely visible even on a clear day from the heights of Gwennap Head. He lacked either the time, or the inclination, or the money to venture out to the islands and survey them himself, so he did the next best thing. On the left side of his superlative map, beneath the cartouche, sits an inset of the Scillies, engraved on the same scale as the rest of the county. It is a copy of Greenvile's Collins' survey of the islands, the *Pilot*'s Chart 20.

The legend states: 'The islands were not surveyed by the Author of this Mapp, but by Captain Greenvile Collins, whose skill and care is no ways

questioned.’

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Appendix A

Greenvile Collins Timeline

Dates in Roman type indicate documented records. Dates in *italics* are undocumented.

1643	5 Sept: baptised at North Tawton church, Devon, England
1665	Possibly with the fleet of Sir Edward Mountagu, Earl of Sandwich, in Orkney, and therefore perhaps also at the battle of Vågen
1666	In Fowey, possibly aboard a frigate escorting a merchant fleet to Virginia
1669–71	Master's mate, HMS *Sweepstakes* (Capt John Narbrough) in the South Seas
1672	Master's mate, HMS *Triumph*, at the battle of Solebay
1673	Master's mate, HMS *Triumph* (Capt William Davies), possibly at the battles of Schooneveld and Texel
1676	May–Aug: master, HMS *Speedwell* (Capt John Wood), NE Passage expedition, returning aboard the *Prosperous*
1676–77	Nov '76–Sept '77: master, *Charles* galley (Capt Thomas Hamilton), Thames to the Mediterranean

1677	Sept-Oct: master, *James* galley (Capt George Canning), Mediterranean
1677–78	Oct ’77–May ’78: master, HMS *Newcastle* (Capt Gustavus l’Holstein), Mediterranean
1678–79	May ’78–July ’79: master, HMS *Plymouth* (Capt John Narbrough), Mediterranean, then to Portsmouth
1679	July: commander, HMS *Lark*, Portsmouth, Channel Islands, Thames
1679	14 Sept: married Elinor Hocker at St Margaret’s church, Westminster
1680–81	Jan ’80–May ’81: master, HMS *Leopard* (Capt John Berry; Duke of Grafton), Thames, Mediterranean
1680	8 Aug: Isabella Collins baptised, St Margaret’s church, Westminster. Buried 7 Sept, age one month
1681–82	Captain, *Merlin* yacht
1682	19 Mar: Barbara Collins baptised, St Margaret’s church, Westminster
1683	Made younger brother of Trinity House
1683	7 Dec: Greenvile Collins Jr baptised, St Margaret’s church, Westminster
1683–87	Captain, *Monmouth* yacht
1684	Surveying River Thames ‘encroachments’ in London for Charles II
1685	14 Mar: Elizabeth Collins baptised, St Margaret’s church, Westminster

1686	14 Oct: James Collins baptised, St Margaret's church, Westminster
1688	18 Feb: America Collins baptised, St Margaret's church, Westminster. Buried 11 Mar 1689, age 1
1688	Surveying the River Medway for James II
1688	June–Sept: captain, *Merlin* yacht, commanding Portsmouth guard boats
1688–89	Sept '88–Jan '89: master, HMS *Resolution* (Baron Dartmouth, admiral; Capt William Davies)
1689	11 Feb: John Collins baptised, St Margaret's church, Westminster
1689–93	Captain, *Mary* yacht
1692	7 May: William Collins baptised, St Nicholas' church, Deptford
1693	Made elder brother of Trinity House
1693–94	Dec '93–Mar '94: captain, *Fubbs* yacht
1694	Died 23 March. Buried 28 March at St Margaret's church, Westminster

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Appendix B

The Charts

There was no standard chart selection in the 1693 edition of the *Pilot*, but it appears that all copies begin with the elaborately engraved frontispiece opposite the title page printed in red and black, followed by the dedication to the king, the salutation from Viscount Sydney, the Dutch copyright notice, and Collins' address to Trinity House. These pages are followed by his preface to the reader, with an inset plate showing the compass variation he found at various places in 1685 and 1693, and a two-page list of subscribers. Then comes the seventeen pages of text for Part 1, plus a three-page list of courses and distances, two pages of tide tables, and finally the charts of the south and west.

Part 2 has its own title page, followed by twenty-four pages of text (including the small chart of Coquet Island), a table of courses and distances, and then the Thames, eastern and northern charts. There were also three pages of coastal profiles – two at the end of Part 1 (marked 39, or 1 and 2 in early examples), and one at the end of Part 2 (marked V).

The forty-seven charts themselves are listed here in the order in which they are often found in 1693 copies of the *Pilot*. The numbering and lettering are those used by Collins. Where Collins gave his charts titles, these are in italics. Scale factor calculations use the seventeenth-century nautical mile of 6,120ft. Information from Verner (1969) is marked by an asterisk (*), and from Hughes (2022) by a cross (†).

CHARTS IN THE 1693 EDITION OF GREENVILE COLLINS' GREAT BRITAIN'S COASTING PILOT

Chart 4, English Channel, including Severn Estuary and southern Brittany
Dedication: Adm Killegrew. Scale: 20 leagues to 3.62in, or 1:1,217,000 approx. Latitude scale: yes. Engraver's signature: no. Dated: no. This chart only appears in 1693 editions of the *Pilot*.

Chart 5/6/7, English Channel, including southern St George's Channel and south Brittany, and inset of Brest harbour
Dedication: Lords of the Admiralty. Scale: 15 leagues to 5.39in, or 1:613,000 approx. Latitude scale: yes. Engraver's signature: I Harris. Dated: 1693. Printed from three plates. This chart only appears in 1693 editions of the *Pilot*.

Chart 8, Rye harbour and approaches
Dedication: Hon Robert Austen. Scale: 1 mile to 3.94in, or 1:19,000 approx. Latitude scale: no. Engraver's signature: no. Dated: no. Single page chart. Early examples have no number.*

Un-numbered, Isle of Wight
Dedication: Adm Edward Russell. Scale: 6 miles to 4.29in, or 1:103,000 approx. Latitude scale: no. Engraver's signature: J Harris. Dated: no. Collins refers to it as chart number 9 in his sailing directions. Manuscript draft in UKHO (B901).

Chart 12, Portland and Weymouth
Dedication: Capt George St Lo. Scale: 1 mile to 1.53in, or 1:48,000 approx. Latitude scale: no. Engraver's signature: no. Dated: no. Early examples have no number and differ in their placing of the sandbanks. Cartouche cut out and substituted prior to 1693, necessitating printing from two plates. Re-engraved on one plate 1756.* Manuscript draft in UKHO (B883).

Chart 14, South Devon from the River Exe to Newton Ferrers
Dedication: Hon Thomas Herbert. Scale: 10 miles to 4.88in, or 1:150,000 approx. Latitude scale: no. Engraver's signature: I Harris. Dated: no. Plate recut 1792.* Manuscript draft in UKHO (B884).

Chart 15, Dartmouth
Dedication: George, Lord Dartmouth. Scale: 1 mile to 3.74in, or 1:20,000 approx. Latitude scale: no. Engraver's signature: F Lamb. Dated: no. Manuscript draft in UKHO (B885).

Chart 16, Plymouth
Dedication: Adm Arthur Herbert. Scale: 1 mile to 2.56in, or 1:29,000 approx. Latitude scale: no. Engraver's signature: no. Dated: no. Early examples have no number.*

Chart 17, Fowey & Mounts-Bay
Dedication: Ionathan Lord Bishop of Bristol. Scale: 1 mile to 3.94in, or 1:19,000 approx. Latitude scale: no. Engraver's signature: Ia Clerk. Dated:

no, but advertised in the *London Gazette* in 1686. Manuscript draft in UKHO (B886).

Chart 18, Falmouth

Dedication: Sir Peter Killegrew. Scale: 2 miles to 3.42in, or 1:43,000 approx. Latitude scale: no. Engraver's signature: no. Dated: no. Includes inset of Helford Sound.

Chart 19, Land's End, the Lizard and the Isles of Scilly

Dedication: East India Company. Scale: 3 leagues to 2.32in, or 1:285,000 approx. Latitude scale: yes. Engraver's signature: no. Dated: 1686. Early examples have mismatched latitude scales labelled 'sea latitude' and 'land latitude', and King James Bank instead of Collins Bank.† Manuscript draft in UKHO (B887). Hughes' assertion that the manuscript draft has 'King James Bank' is incorrect.

Chart 20, The Islands of Scilly

Dedication: Duke of Grafton. Scale: 1 mile to 1.97in, or 1:37,000 approx. Latitude scale: erased. Engraver's signature: Yeates. Dated: 1689. Corrections made later to names of various rocks, top right. Gillston rock and 'Sr Clously lost' added for 1723 edition. After 1738* a printed description of the tides 'by Abraham Tovey' is often found attached to the bottom edge. Plate recut 1789.* Manuscript draft in UKHO (B888).

Unnumbered, St George's Channel

Dedication: Sir Richard Rooth. No scale bar, 1:980,000 approx.* Latitude scale: yes, but with bizarre numbering. Engraver's signature: no. Dated: no. Verner's assertion that this chart was advertised in the *London Gazette* no. 2558, 15 May 1690, is incorrect. Early examples have no cartouche.* Plate recut 1776.*

Unnumbered, The River Avon

Dedication: Worshipfull Robert Yate. Scale: 1 mile to 3.94in, or 1:19,000 approx. Latitude scale: no. Engraver's signature: no. Dated: no. Early examples have blank cartouche.* Plate recut 1774.*

Unnumbered, Bristol Channel

Dedication: Sir Robert Southwell. Scale: 7 leagues to 4.45in, or 1:350,000 approx. Latitude scale: no. Engraver's signature: no. Dated: no, but includes inset showing William III's arrival on 6 Sept 1690. Plate refreshed 1753.*

Chart 24, Milford-Haven

Dedication: Henry Herbert Duke of Beaufort, etc. Scale: 1 mile to 1.38in, or 1:53,000 approx. Latitude scale: no. Engravers' signatures: James Moxon, Ja Collins. Dated: no. Early examples have no ships and no note.†

Chart 25, Milford Hauen and the Islands Adjacent

Dedication: Sir Hugh Owen. Scale: 7 miles to 4.21in, or 1:122,000 approx. Latitude scale: no. Engraver's signature: Ja Collins. Dated: no. Plate recut 1779.*

Chart 26, Western Irish Sea from Milford Haven to Anglesey

Dedication: Sir Clodisley Shouell. Scale 15 miles to 2.64in, or 1:445,000. Latitude scale: yes, originally labelled 'sea' and 'land' and substantially misaligned, then labels and western scale erased.† Engraver's signature: no. Dated: no. Early examples have no number. Scale bar repositioned, and some copies show traces of the original. Manuscript draft in UKHO (B889).

Chart 27, Holy-Head

Dedication: Capt William Wright. Scale: 2 miles to 3.15in, or 1:47,000 approx. Latitude scale: no. Engraver's signature: no. Dated: no. Early examples have no number, and the dedication is to Thomas Hewetson. Plate recut 1779.* Manuscript draft noted by Verner in UKHO (B890), has disappeared.

Chart 28, Menai Straits

Dedication: Sir William Williams. Scale: 5 miles to 3.94in, or 1:93,000 approx. Latitude scale: no. Engraver's signature: no. Dated: no. Early examples have no number.* Manuscript draft in UKHO (B891).

Chart 29, Irish Sea from Anglesey to the Mull of Galloway

Dedication: Sir John Lowther. Scale: 15 statute miles to 2.40in, or 1:459,000. Latitude scale: yes, substantially misaligned (but see Chapter 5). Early examples show western latitude scale poorly erased. It was later reinstated without correction. Engraver's signature: no. Dated: 1689. Early examples have no number,† and latitude scales labelled 'sea latitude' and 'land latitude'. Manuscript draft in UKHO (B894). Plate recut 1774.*

Chart 30, The River Dee or Chester-Water

Dedication: King William III. Scale: 5 miles to 3.86in, or 1:95,000 approx. Latitude scale: yes, western edge only, originally labelled 'sea', then 'land', then labels erased. † Engraver's signature: Ja Collins. Dated: 1689. Advertised in the *London Gazette* no. 2558, 15 May 1690. Early examples

variously have no number,* ships, engraver's signature,† cherubs, or note. Plate recut 1774.* Manuscript draft in UKHO (B892).

Chart 31, Isle of Man
Dedication: William Earl of Derby. Scale: 4 miles to 2.72in, or 1:108,000. Latitude scale: yes, western edge only. Engraver's signature: H Moll. Dated: no. Early examples have no number.† Plate recut 1774.* Manuscript draft in UKHO (B893).

Chart 32, Carrickfergus Lough
Dedication: King William III. Scale: 4 miles to 3.94in, or 1:75,000 approx. Latitude scale: no. Engraver's signature: Collins, but engraved so lightly (below centre of cartouche) as to be discernible only in the earliest impressions. Dated: no, but dates appear on the chart itself. Early examples have no number.* Plate recut 1774.*

Chart 33, Carlingford Lough
Dedication: Mr Reeve Williams. Scale: 3 miles to 2.95in, or 1:75,000 approx. Latitude scale: no. Engraver's signature: J Harris. Dated: no. Single page chart. Early examples have no dedication or engraver's signature.*

Chart 34, Dublin Bay
Dedication: James Duke of Ormond. Scale: 2 miles to 3.98in, or 1:37,000 approx. Latitude scale: no. Engraver's signature: no. Dated: no. Early examples have no number and no plan of Dublin.* Plate recut 1774*. Verner mentions a manuscript draft held by the British Museum, which is now in the British Library (Maps K.Top.53.5). However, it is not the manuscript for this chart.‡

Unnumbered, Kingsale Harbour
Dedication: Sir Robert Southwell. Scale: 1 mile to 4.29in, or 1:17,000 approx. Latitude scale: no. Engraver's signature: J Harris. Dated: no. Early examples have no dedication.† Plate recut 1774.*

Unnumbered, Coquet Island and Amble
Dedication: no. Scale: 3 miles to 2.99in, or 1:74,000 approx. Latitude scale: no. Engraver's signature: J Harris. Dated: no. Manuscript draft in UKHO (B879). Printed within Part 2 of the *Pilot*'s text: appears on p. 13 in 1693, p. 18 in subsequent editions, and p. 22 from 1774.*

Chart B, North Sea from Dungeness to Edinburgh
Dedication: Sir Ralph Delaval. Scale: 20 leagues to 3.94in, or 1:1,120,000 approx. Latitude scale: yes. Engraver's signature: no. Dated: no. Manuscript draft in UKHO (B877). Plate recut 1776.*

Chart 3, Southern North Sea
Dedication: Adm Sir John Ashby. Scale: 10 leagues to 3.42in, or 1:650,000 approx. Latitude scale: yes. Engraver's signature: no. Dated: no. Plate recut 1776.*

Chart 2, East Coast of England from Dover to Spurn Head, with inset of River Thames

Dedication: Trinity House. Scale: 15 miles to 3.31in, or 1:333,000 approx. Latitude scale: no. Engraver's signature: J Harris. Dated: no. Printed from two plates: chart number is top centre. Inset scale is 1:12,000 approx. Plate recut and Richard Mount's imprint deleted 1776.*

Chart E, Harwich

Dedication: Hon Samuell Pepys. Scale: 2 miles to 3.07in, or 1:48,000 approx. Latitude scale: no. Engraver's signature: Herman Moll. Dated: 1686. Manuscript draft in UKHO (B882). Early examples show traces of Wagtaile Hall out of position slightly to the north. Plate recut 1776.*

Chart F, Yarmouth

Dedication: Henry Duke of Norfolk. Scale: 3 miles to 2.32in, or 1:95,000 approx. Latitude scale: no. Engraver's signature: no. Dated: no. Manuscript draft in UKHO (B881). Early examples show traces of a deleted lighthouse above the cartouche. Plate recut 1776.

Chart G, Blakeney Harbour

Dedication: Sir Clodisley Shouel. Scale: three-quarters of a mile to 2.20in, or 1:19,000 approx. Latitude scale: no. Engraver's signature: J Harris. Dated: no. Single page chart. Manuscript draft in UKHO (B880). Early examples have no letter.

Chart H, The River Humber

Dedication: Trinity House. Scale: 7 miles to 5.64in, or 1:91,000 approx. Latitude scale: no. Engraver's signature: no. Dated: no. Plate recut 1776.*

Chart I, Burlington Bay, Scarbrough and Hartlepoole

Dedication: Capt Ralph Sanderson. Scale, Burlington Bay: 3 miles to 2.95in, or 1:75,000 approx; Scarborough: 1 mile to 1.96in, or 1:37,000 approx; Hartlepool: 1 mile to 3.87in, or 1:19,000 approx. Latitude scale: no. Engraver's signature: Yeates. Dated: 1686. Manuscript draft in UKHO (B900). Early examples have no letter. Date deleted 1723.* Plate recut 1774.*

Chart L, Newcastle uppon Tyne, Blyth and Sunderland

Dedication: Trinity House. Scale: 2 miles to 3.50in, or 1:42,000 approx. Latitude scale: no. Engraver's signature: H Moll. Dated: no. Early examples have no letter.* Plate recut 1776.*

Chart M, Holy Island, Staples and Barwick

Dedication: Capt Will Davies. Scale: 2 miles to 3.92in, or 1:37,000 approx. Latitude scale: no. Engraver's signature: FW Oetyes. Dated: no. Includes inset of Berwick on a scale of half a mile to 1.96in, or 1:19,000 approx. Manuscript draft in UKHO (B878). Plate refreshed 1756, recut 1776.*

Chart C, The East Coast of Scotland with the Isles of Orkney and Shetland

Dedication: Adm George Rooke. Scale: 20 leagues to 3.94in, or 1:1,120,000 approx. Latitude scale: yes. Engraver's signature: no. Dated: no. Plate partially recut 1776.*

Chart N, Firth of Forth

Dedication: Iames Earle of Perth. Scale: 5 miles to 2.79in, or 1:132,000 approx. Latitude scale: yes. Engraver's signature: I Collins. Dated: no. Early examples have mismatched latitude scales labelled 'sea latitude' and 'land latitude'.† Manuscript draft in UKHO (B899). Early examples have no letter.* Plate recut 1776.*

Chart O, Leith and approaches

Dedication: Sir Iames Fleming. Scale: no. Latitude scale: no. Engraver's signature: Ni Yeates. Dated: no. Early examples have no letter. Plate recut 1776.*

Chart P, Dundee, Aberdeen and Montrose

Dedication: Magistrates of the City of Aberdeen. Scale, Dundee: 3 miles to 1.85in, or 1:119,000 approx; Aberdeen: 1 mile to 3.07in, or 1:24,000; Montrose: 0.5 miles to 2.91in, or 1:13,000 approx. Latitude scale: no. Engraver's signature: no. Dated: no. Manuscript draft in UKHO (B898). Plate recut 1776.*

Chart Q, Moray Firth

Dedication: Lord Viscount Torbat. Scale: no. Latitude scale: yes. Engraver's signature: H Moll. Dated: 1689. Blank plaque above cartouche. Manuscript draft in UKHO (B897). Plate recut 1776.*

Chart R, The Islands of Orkney

Dedication: George Prince of Denmark. Scale: 10 miles to 2.52in, or 1:290,000 approx. Latitude scale: yes. Engravers' signatures: H Moll, J Collins. Dated: no. Early examples have mismatched latitude scales labelled 'sea latitude' and 'land latitude',† and no letter.* Plate partly recut 1776.*

Chart S, The Chiefe Harbours in the Islands of Orkney

Dedication: Capt Will Bond. Scale: 4 miles to 3.94in, or 1:75,000 approx. Latitude scale: no. Engraver's signature: no. Dated: 1688. Early examples have no letter.* Plate partly recut 1756.*

Chart T, Bressay
Dedication: Daniel Earle of Nottingham. Scale: 2 miles to 3.94in, or 1:37,000 approx. Latitude scale: no. Engraver's signature: H Moll. Dated: no. Manuscript draft in UKHO (B896). Early examples have no letter.*

Chart W, The South Part of the Isles of Shetland
Dedication: Mr John Colson. Scale: 3 miles to 2.48in, or 1:89,000 approx. Latitude scale: yes. Engraver's signature: no. Dated: no. Manuscript draft in UKHO (B895).

Charts Found in Later Editions

Greenvile Collins died in 1694, and as the second printing of his *Great Britain*'s *Coasting Pilot* did not appear until 1723, it can be assumed that the new charts that appeared in it, and in the numerous later printings up to 1792, were nothing to do with him. Although they do not bear his name, they were undoubtedly included in his atlas, and can sometimes be found on the market described as Greenvile Collins charts.

A New and Correct Chart of the Channel between England and France
Of some historical importance, this two-plate chart by the astronomer and mathematician Edmond Halley was published separately but also appeared in the 1723 and later printings of *Great Britain*'s *Coasting Pilot*, replacing the two Channel charts (Nos 4 and 5/6/7) of the 1693 edition. It contains many more soundings than its predecessors as well as a lot more detail in the shallows and sandbanks, but is most significant for its tidal arrows and numerals showing not just the direction of the flood tide but also the times of high water in different areas. 'Sold by Page & Mount on Tower Hill', its coverage extends northwards as far as Dublin and Cromer, and includes insets of Plymouth and the Isle of Wight.

A Large Draught of the Downes
One of the most interesting later additions to the *Pilot* is this chart of the Downs, from the North Foreland to Dover Castle and including the Goodwin Sands. It appeared, with subsequent alterations, from 1723, 'Sold by T Page, W & F Mount on Tower Hill'. The cartouche identifies the surveyor as Captain William Nunn. Its complicated lattice of clearing lines and transits offers an insight into the challenges faced by navigators, and provides the clearest possible explanation of what Collins meant when he wrote in his journal, on 21 February 1680: 'At noone anchored in the Downes in 7 fathom water, Deal Castle in the windmill.'

The Harbour of Corke

Another chart that first appeared in the 1723 *Pilot*, ‘Sold by Willm Mount & Thos Page on Tower Hill’, this was also included in some editions of John Seller’s *The English Pilot*. As it is not only unsigned, but also has its soundings in feet, it is unlikely to be related to the survey of Cork that Collins said he undertook in 1687. With various alterations and amendments, it reappeared in several later editions, until its replacement by a new chart in the 1760 printing (see below).

A Draught of Portland the Shambles, and the Race of Portland
An improved version of Collins’ chart 12, with a note explaining that as the Shambles shoal has apparently moved, Collins’ transits have become unreliable. It also offers arrows showing the direction of the tidal flow, and the position of the infamous Race in both northerly and southerly winds. Signed ‘Dunbar’ by the engraver, this chart first appeared in the *Pilot*’s 1744 printing* and remained until 1792, with changes to the engraver’s signature and the rendering of the Race.

A New and Correct Chart of the Harbour of Corke by the Rev J Lindsay
Dated 1759, this was based on a completely new survey and replaced the previous Cork chart, with a different layout, but on virtually the same scale, and with soundings still in feet. It appeared in all editions of the Pilot from 1760 to 1792, ‘Sold by W&J Mount T&T Page on Tower Hill’.

A Large Chart of the Downs
An uncredited copy of the William Nunn chart above, ‘Sold by Mount & Page, Tower Hill’. It replaced the Nunn version in the *Pilot* from 1781.

A New and Correct Large Draught of Plymouth Sound, Catt-water and Ham-Oase
An improved version of Collins’ chart that offers less extensive coverage of the Tamar’s upper reaches, and no inset of Salcombe, but with a more detailed coastal outline, two new transit bearings, and many more hazards marked in the Sound. According to Verner, this chart dates from 1714, when it bore the imprint of Samuel Thornton, but it did not appear in *Great Britain*’s *Coasting Pilot* until the 1792 printing. It is evidently closely related to the Plymouth inset on the Halley Channel chart above.

An Exact Draught [Being an Actual Survey] of the Sea Coast from Arundel in Sussex to St Albans in Dorset
A large folding chart printed from three plates, ‘Sold by R Mount & Comp on Tower Hill’, and dated 1731, this is based on excellent surveys carried out ‘by order of the Government’ by Jos Avery. As well as offering useful coverage of a populous stretch of coastline at a practical scale, it also contains detailed sailing directions and tidal information in its upper corners, testifying to a life independent of any atlas. In spite of its date, it can apparently be found in 1723 editions of the *Pilot* – presumably late printings. It bears strong similarities to the Isle of Wight inset on the Halley chart.

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‡ Apart from the inscription, nothing about it says Collins: the handwriting, the pen, and according to Hughes, even the type of ink, are not consistent with Collins’ work. It is orientated west-up, while

Collins’ chart is north-up. Its rendition of inland features is wholly uncharacteristic. The wording of the note, and its spellings, are unlike anything in Collins. And with soundings in black and red ink, denoting low and high water, it was clearly never intended for engraving.

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Appendix C

Cartographer's Apprentice: The Young Duke's Plane Chart

The unusual, coloured, hand-drawn passage charts in Collins' 1680 journal appear to be the work of two different people. If one was done by the ship's master then the other, surely, was done by his pupil. The evidence suggests that the 'plaine' chart is the seventeen-year-old Duke of Grafton's own work.

Both charts are drafted in pen and ink, their coastlines tinted in watercolour washes from the same colour palette. On the plane chart, the coastal outline and the colouring are more elegantly executed, which makes the Mercator chart look a little rushed. It's the same with the dotted lines that show the ship's progress, zig-zagging each day from noon position to noon position: the track on the plane chart is lightly and carefully touched in, while the dots on the Mercator have been applied so firmly that their impressions are clearly visible in the two pages beneath.

The labelling on the charts, and even the spelling, also look to be the work of two different hands. The ornate 'U' of 'Ushant' and the characteristic 'e' in 'C. St Vincent' on the Mercator would be immediately familiar to anyone who had read this far in Collins' journals. It does look like his handwriting. And while it is not unusual with Collins to find the same words spelt differently on the same page, or even in the same sentence, when it comes to Tangier he is remarkably consistent: in the first

few pages of the 1676–79 journal Collins spells it ‘Tangere’ 3 times and ‘Tangeare’ 6, before settling on Tangier, which occurs 182 times. In the text of the 1680 journal, it is Tangier all the way – 31 times, except for one abbreviation, ‘Tange’, and one ‘Tanger’. On the Mercator chart it is spelt ‘Tangier’, but on the plane chart it’s ‘Tanger’.

The sketchy coastlines, rudimentary colouring and hastily dashed-off dotted lines on the Mercator also seem to speak of the many other demands on the time of a busy warrant officer aboard a serving man-of-war during a troublesome voyage. Young Grafton, meanwhile, had the leisure to sit at the table in the great cabin and work carefully on his plane chart.

Collins probably drew the graticules on both, outlining to his pupil the differences between the two projections as he went, and perhaps having to remind him how the Mercator projection was founded on the discovery that the meridians converge towards the poles in proportion to the cosine of the latitude,[1] and how its parallel meridians allowed ocean navigators to plot their courses as straight lines. Collins also seems to have inked in the latitude and longitude scales around the sides of each chart, adding an instructive distance scale in leagues along the southern edge of the young duke’s plane chart, then letting his pupil draw the coastline. Collins could well have taken his Iberian outline from the ‘English Waggoner’ that he mentions elsewhere, although we don’t know who published it. Grafton might have had his own charts – in fact it would be strange if a son of the king did not have his own beautiful, hand-coloured Dutch sea atlas – but we don’t know what he was copying from either. It was certainly a different chart from the one his teacher used.

The latitudes of Grafton’s nicely executed coastline were in accord with the accepted values of the time, as shown in John Seller’s *Practical Navigation* almanac, with the Scilly Isles sitting astride the fiftieth parallel, Cape Finisterre more or less at 43°, and Cape St Vincent on 37°. His enthusiastic penmanship exaggerated the arc of Cádiz Bay and teased a pleasing curvature out of the north coast of Spain that increased that country’s northward extent by a full degree. When he sat back to admire the

result of his labours, the young duke must have been happy with it. It is an attractive artefact.

However, it was his longitudes that let him down. Both charts took the longitude of Cádiz as their prime meridian. In aligning the essentials of his plane chart with Collins' Mercator, Grafton could see that Cape Finisterre and the Burlings were on the same meridian, but he didn't notice which one. Collins has them 4° west of Cádiz, while Grafton makes it only 3°. He also placed the crucial headlands of Ushant and the Lizard 1° too far west.

The young duke doesn't seem to have noticed his error. He might have already decided that his talents lay more in the artistic line, for when it came to the daily task of plotting the ship's coordinates, he didn't bother. If he had, he would immediately have seen that his longitudes were wrong. Instead he seems simply to have copied, by eye, what the *Leopard's* master had done, counting off the meridians from the Iberian coastline on the Mercator chart before counting them off on his own. As the longitudes of the coastlines on the two charts differ from each other by a full degree, young Grafton ended up drawing his track of the ship's progress further east than Collins' by 40 miles or so.

Both tracks stop on 27 November, during a few days of uncharacteristic calms. They had seen 'a Turk' at 44°N, which easily outsailed them and made good its escape, and they had spoken to an Indies-bound Dutchman, eight days out of Torbay. Collins did not come back to his chart, so when Grafton returned to his, four days later, he could no longer simply copy his track from Collins, but had to plot the coordinates himself. He began with the ship's latitude and longitude for 1 December, intending to work back from there and dot in the missing days, and it was at this point he noticed his mistake. His longitude scale was one degree out. But rather than confess, he fudged it, gradually reconciling his new dotted line for the previous three days and making it converge with the old one.

Maybe no one would notice.

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Glossary

Amplitude
Amplitude is the angle between the bearing of the heavenly body at rising or setting and true east or west, measured using an azimuth compass. With the additional help of declination tables, it can be used to determine the local magnetic variation.

Backstaff
A medieval development of the cross-staff, which allowed the user to stand with his back to the sun, reading off its angle on a graduated shaft using a sliding shadow vane. See also cross-staff, quadrant, Davis quadrant.

Bearing
The angle measured between an observed object and magnetic north, best obtained by using an azimuth compass. If the object is stationary, perhaps on shore, this gives the navigator a position line. The intersection of two or more such position lines gives the navigator a position.

Cable
Today, one tenth of a nautical mile. In the seventeenth century, 120 fathoms, or 720ft. Also, the chain or rope attaching a ship to its anchor.

Clearing line
A line on a chart formed from an alignment of two fixed objects, or from a bearing to a fixed object, to help the navigator keep clear of hidden dangers. See also transit.

Compasses
Seventeenth-century ships' compasses were of the 'dry card' type, not damped with spirit or oil, and must have been close to useless in rough weather. In Collins' day most compasses were graduated not into 360° but into thirty-two points, each of 11.25°. The text spells out the abbreviations for these points that Collins used, e.g.: north-east for NE, south-east by south for SEbS. Sometimes Collins referred to half-points, e.g.: 'From Portland to the Start, W by S, half S.' Occasionally he used quadrantal bearings, e.g.: S45°E, meaning 45° towards E from S, i.e. 135°. The azimuth compass was a more refined instrument, with a card graduated in degrees as well as points, and fitted with sights to allow accurate bearings to be measured.

Cross-staff
A graduated stick with a sliding vane for measuring the sun's altitude above the horizon. Often fitted with tinted glass to protect the user's eyesight. Originating in antiquity, it was still in use in the seventeenth century.

Dates
Catholic Europe moved from the old Julian to the new Gregorian calendar in 1582. It would be 170 years before the UK followed suit, and I have not attempted to bring Collins' dates into line with our

own (if you want to, add eleven days). To prevent confusion between the new New Year (1 January) and the old (25 March) Collins used double-dating between those dates, e.g. 13 February 1682/3. For clarity in the text, in those few instances where it was necessary, I have decided that the new year began for Collins, as it does for us, on 1 January.

Davis quadrant
A sixteenth-century refinement of the backstaff, purportedly invented by the English explorer John Davis. With two arcs instead of one, of 30° and 60°, it allowed accuracy of up to one sixth of a degree. By Collins' day the Davis was becoming standard equipment for professional navigators.

Declination
The angular distance from the celestial equator to a heavenly body; it is the astronomical equivalent of latitude on the surface of the Earth. In Collins' time there were precalculated declination tables giving the value for each day of the year.

Fathom
6ft, or 1.83m.

Knot
The navigator's unit of speed: one nautical mile per hour. See also latitude.

Latitude
Distance from the equator. By convention, a latitude of 30° and 55 minutes north of the equator is written 30° 55'N. One degree of latitude is 60 nautical miles, and each degree is divided into 60 minutes. Latitude is found by measuring the angle of the sun above the horizon at noon. With no reliable timepieces available, the angle was measured as the sun approached its zenith, and noon was declared when it appeared to have reached its highest point. The navigator then looked up the date in his declination tables. Polaris, the Pole Star, is easier: its height in degrees is your latitude. In Collins' day it was less accurately aligned with the North Pole than it is now, but still useful: Columbus and Magellan both used it.

Lead line
For Collins and his contemporaries, depths were measured in fathoms, using a lead line – a long length of twine with a lead weight on the end. It was often primed with a lump of sticky tallow on its base for collecting samples of sand and shell from the seabed, to help with position fixing.

League
3 miles.

Log
A shaped piece of wood intended to act as a drogue when thrown into the ship's wake, attached to a length of knotted twine. The number of knots run out in the space of thirty seconds was the ship's speed in knots.

Longitude

Distance east or west of a fixed point. Meridians of longitude run from pole to pole and unlike parallels of latitude cannot be used to measure distance as they converge towards the poles. There was no ‘prime meridian’ in Collins’ day. Instead, navigators would begin estimating their change in longitude from their point of departure.

Mile
A statute mile is 1,760 yards, 5,280ft, 1.61km. A nautical mile is one minute of latitude, now agreed to be 6,076ft, but in Collins’ day it was 6,120ft. Collins used both nautical and statute miles. A mile was not an internationally agreed standard unit in the seventeenth century. Different countries had different miles. In the text, unless it says otherwise, a mile can be assumed to be a nautical mile.

Quadrant
An instrument for measuring the altitude of a heavenly body. The most basic type was a quarter-circle of brass or wood with a string and a weight from which to read off the angle. By the seventeenth century much more elaborate types were available. See also cross-staff, backstaff, Davis quadrant.

Rates
A method of ranking naval vessels by size and importance, from enormous first rates with 100 cannon and 600 crew to diminutive sixth rates not much bigger than the king’s yachts. During Collins’ time the king and Samuel Pepys rationalised the rating system to reflect a ship’s armament, because everything from its crew to its capabilities was determined by the number of guns it carried.

Rhumb line
A straight line drawn across meridians of longitude on the Earth’s surface, crossing them all at the same angle. Because of the convergence of the meridians towards the poles, a navigator attempting to steer such a course on a long passage ends up sailing in a curve. It was to counter this problem that the Mercator projection was devised.

Tides
Spring tides represent the maximum difference, or range, between high and low water, and are interspersed with more moderate neap tides on a fortnightly cycle. For the times and dates of seventeenth-century sunrises and moon phases, pre-corrected for the Julian calendar, refer to the amazing website timeanddate.com.

Transit
A position line created by lining up two objects, usually on shore, to help the helmsman ensure that his ship is clear of hazards. See also clearing line.

Trinity House
Founded by Henry VIII in response to a deputation of Deptford ship owners to regulate pilotage on the River Thames, with similar organisations established around the same time in Kingston upon Hull and Newcastle upon Tyne. In addition to providing qualified pilots, by Collins’ time Trinity House was also responsible for lighthouses and navigation buoys in English waters.

Variation

The difference between true north and magnetic north. Navigators in the seventeenth century knew how to work it out (after observing the sun's amplitude at sunrise and sunset) but they didn't always bother. Because variation was known to differ from place to place, the compass roses on Collins' (and everyone else's) charts were always aligned with true north.

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2 Ritchie, p. 22
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5 Hughes, p. 17
6 https://royalsocietypublishing.org/toc/rstl/1683/13/143
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9 TNA: ADM 33/113
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11 Davies, *PN*, p. 150

Chapter 1: Polar Bears are Delicious

1 NRS v57, p. 291
2 All unattributed quotes are from Collins' Arctic journal, 1676, courtesy Arader Galleries, New York. The spelling is his, but I have modernised the punctuation in places
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4 Wood, p. 151
5 Wood, p. 150
6 Charnock
7 NRS vol. 57, p. 306
8 NRS vol. 36, p. 183
9 NRS vol. 60, p. 133. According to the King, Capt. Golden was later found hanged in a wood
10 BL: Add MS 8890 A, 'Journal of Voyages to the Caribbean and South America 1666–1671'. There is also a published version: *An Account of Several Late Voyages and Discoveries*, 1711. (Accessed via http://libros.uchile.cl/files/presses/1/monographs/481/submission/proof/index.html#39/z)
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18 All unattributed quotations in this chapter are from Collins' journal
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21 NRS vol. 86, p. 278
22 Hughes, p. 102
23 Kishlansky, p. 215
24 Rodger, p. 40
25 NRS v57, p. 354
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28 NRS v57, pp. 353–4

Chapter 2: Blood and Treasure

1 All unattributed quotations are from Collins' journal [TNA: ADM 7/688]. The spelling is his, but I have modernised the punctuation in places
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3 NRS v57, p. 349
4 BWAS, p. 116
5 NMM: BHC3254
6 NRS v57, p. 198
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11 NRS v57, p. 219
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15 Latham, p. 408
16 Rodger, p. 88
17 TNA: ADM 106/317/238
18 TNA: ADM 106/317/240
19 TNA: ADM 106/323/432
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21 TNA: ADM 106/322/1
22 TNA: ADM 106/322/5
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Chapter 3: Polishing the Young Duke

1 Davies, *PN*, p. 96
2 Teonge, p. 280
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4 Davies, *PN*, p. 72
5 All unattributed quotations are from Collins' journal. [NLW: MS Deposit 38B] The spellings are his, but I have modernised the punctuation in places
6 Killigrew's letters: TNA: ADM 106/351/29; ADM 106/351/31; ADM 106/351/33; ADM 106/351/2
7 NRS vol. 26, pp. 193–4 and TNA: ADM 106/333/72
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13 TNA: ADM 106/352/370
14 Berry, 20 Feb
15 TNA: ADM 106/347/141
16 TNA: ADM 106/347/14
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29 Berry, 16 Nov
30 Berry, 20 Nov
31 TNA: ADM 106/347/154

Chapter 4: Hydrographer to the King

1 BWAS, pp. 290–2
2 BWAS, pp. 33, 61
3 Davies KS, p. 147
4 BWAS, p. 286
5 https://thelondoncityguide.co.uk/category/c21-churches
6 NRS vol. 86, pp. 121–2, 205
7 NRS vol. 86, p. 319
8 NRS vol. 60, p. 238
9 Hughes, p. 18
10 Registers and Books of St Margaret's Church, Westminster: MA/01/01/007
11 NRS vol. 60, p. 125 (Mountfield)
12 SP 23 June 1681
13 SP 15 May 1684
14 Sarah Tyacke, Catalogue of the Pepys Library vol. IV 1989
15 NRS vol. 60, p. 135
16 Evelyn, pp. 617–18 (2 September 1680)
17 Hughes, p. 108

18 NRS vol. 73, p. 107. When Pepys heard this he was not impressed. For an alternative view, see https://laurenceworms.wordpress.com/2015/07/30/seller-pepys-and-the-seventeenth-century-london-map-trade
19 https://en.wikipedia.org/wiki/John_Adams_(cartographer)
20 Hughes, pp. 110–1
21 Davies, p. 32
22 NRS vol. 60, pp. 188–9
23 NRS vol. 60, p. 188
24 Evelyn, p. 390 (1 October 1661)
25 Davies, pp. 82–3
26 Hughes, p. 109
27 BWAS, p. 252
28 TNA: ADM/106/354/347
29 May, p. 82
30 TNA: ADM/106/383/227
31 NMM: ADM/A/1805/151
32 May, p. 123
33 https://collection.sciencemuseumgroup.org.uk/objects/co55422/wooden-backstaff-or-davis-quadrant-made-by-john-gilbert-on-tower-hill
34 Levi ben Gerson and the Cross Staff Revisited, B.R. Goldstein, https://muse.jhu.edu/pub/3/article/453377/pdf
35 William Leybourne, *Compleat Surveyor* (1653), p. 39
36 Robinson, p. 48
37 Hughes, p. 118
38 TNA: ADM/106/354/349
39 NRS vol. 60, pp. 132–3, 189; SP June 1682
40 TNA: ADM/106/354/351
41 UKHO: B884
42 Hughes, p. 122
43 Lincoln, p. 161
44 Lincoln, p. 53
45 BWAS, pp. 297–9
46 Davies, *KS*, p. 61
47 Evelyn, 12 April 1682
48 Skelton, p. 195
49 TNA: MPHH 1/25
50 LMA: CLC/521/MS02745
51 Everard and Hughes
52 Cornwall Council Archives: GO/574
53 2019 edition
54 TNA: ADM 106/359/643
55 Evelyn, 2 February 1683

Chapter 5: Questions of Degree

1 Tomalin, p. 3
2 Latham, p. 283
3 NRS vol. 27, p. 232
4 Philosophical Transactions of the Royal Society, no. 143, 1683
5 https://royalsocietypublishing.org/toc/rstl/1683/13/143
6 Wells, p. 51
7 www.rmg.co.uk/stories/blog/library-archive-volunteers/great-britains-coasting-pilot-navy-board
8 NRS vol. 73, p. 319
9 https://laurenceworms.wordpress.com/2015/07/30/seller-pepys-and-the-seventeenth-century-london-map-trade
10 Schotte, p. 95
11 NRS vol. 73 p. 318
12 TNA: ADM/106/364/335/604
13 Hughes (p. 147, note 186) suggests Seller as a possible source, who might well have based his chart on Doncker's
14 TNA: ADM/106/359/645 and ADM/106/364/338/602
15 BWAS, p. 252
16 Robinson, p. 207
17 Hughes, p. 123
18 NLS: Adv.MS.70.2.11 (Adair 1)
19 NLS: Adv.MS.70.2.11 (Adair 4)
20 NLS: https://web.archive.org/web/20090714125927/http://www.nls.uk/maps/counties/info.html
21 NLS: Adv.MS.70.2.9 (Pont 31)
22 Cairt
23 NRS vol. 60, p. 221
24 William Ravenhill, *The Geographical Journal*, vol. 144 no. 3
25 Hughes, p. 138
26 Hughes, p. 180
27 Hughes, p. 138
28 Hughes, pp. 30–1, 136–9
29 www.rmg.co.uk/collections/objects/rmgc-object-42248
30 Schotte, p. 95
31 Map Collector's Circle vol. 6, no. 58
32 31 May 2015
33 May, p. 76
34 W.E. May, *The Last Voyage of Sir Clowdisley Shovel*, Journal of the Institute of Navigation, vol. 13 no. 3 (July 1960)
35 Hughes, p. 192
36 Hughes, pp. 111–15
37 Held by the Pepys Library
38 LMA: CLC/521/MS02745

39 Hughes, p. 115
40 Hughes, p. 130
41 TNA: MPHH 1 25
42 SP: September 1683
43 Onnekink

Chapter 6: Conspiracy and Crisis

1 Kishlansky, p. 251
2 Kishlansky, p. 243
3 Houston, p. 45
4 Russell, p. 645
5 Jackson, p. 31
6 BWAS, p. 61
7 Kishlansky, p. 239
8 Womersely, p. 32
9 Kishlansky, p. 264
10 Bryant, p. 250
11 Bryant, p. 253
12 All unattributed quotes are from Collins' 1688 journal, Caird DAR/18. The spelling is his, but I have modernised the punctuation in places
13 Bryant, p. 255
14 Bryant, pp. 255–64
15 NRS vol. 86, pp. 297–314
16 Latham, pp. 207–8 (www.gloucester1682trust.org)
17 Jowitt
18 ODNB
19 BWAS, pp. 63–4
20 NRS vol. 73, p. 224
21 NRS vol. 73, pp. 151–2
22 NRS vol. 73, p. 166
23 'Women and the History of Samuel Pepys' Diary', Kate Loveman. *The Historical Journal* (Cambridge University Press, 2022) vol. 65, pp. 1221–43
24 Latham, p. 298
25 NRS vol. 73, p.xlv
26 NRS vol. 73, p. 13
27 NRS vol. 73, p. 219
28 NRS vol. 73, p. 210
29 NRS vol. 73, p. 221
30 NRS Col 73, p. 151
31 NRS vol. 73, p. 174
32 NRS vol. 73, p. 186
33 NRS vol. 73, p. 210

34 Powley, p. 25
35 NRS vol. 73, p. 116
36 Hughes, p. 231
37 Bryant, p. 70
38 Davies, *KS*, p. 232
39 Davies, *KS*, p. 232
40 Jones, p. 232
41 Jones, p. 286
42 Powley, p. 54
43 BWAS, p. 59
44 Powley, p. 28
45 Bryant, p. 284
46 BWAS, p. 120
47 Bryant, p. 284
48 Wilson, p. 263
49 Bryant, p. 289
50 *London Gazette*, no. 1778, p. 2
51 Fitzroy, p.vi
52 Fitzroy, p. 44
53 Fitzroy, p. 60
54 Davies, *KS*, p. 234
55 Jones, p. 232
56 Davies, *KS*, p. 232
57 Wilson, p. 264
58 Fitzroy, p. 60
59 Davies, *KS*, p. 94
60 TNA: ADM 33/113
61 HMS *Albemarle*, ninety guns
62 Bryant, p. 289
63 Davies, *KS*, p. 233
64 Powley, pp. 19–20
65 These no longer break the surface, but in Collins' day they dried at low tide [*Historical Changes in the Seabed of the Greater Thames Estuary*, H Burningham & J French, UCL 2008]
66 Rodger, p. 137
67 Latham, p. 208
68 Powley, p. 84
69 Jones, p. 233
70 Powley, pp. 84–5
71 Powley, pp. 101, 107
72 Powley, p. 117
73 Jones, p. 233
74 Latham, p. 208; NRS vol. 60, p. 272
75 Powley, p. 114
76 Powley, p. 112

77 Kishlansky, pp. 279–80
78 Jones, p. 305
79 Powley, p. 144
80 Powley, p. 146
81 Powley, p. 131
82 Powley, p. 144

Chapter 7: A Multiplicity of Herberts

1 Kishlansky, p. 277
2 Kishlansky, pp. 283–5
3 Kishlansky, pp. 285–6
4 Keates, p. 40
5 ODNB
6 Rodger, p. 201
7 Jones, p. 329
8 TNA: ADM 106/403/224
9 TNA: ADM 106/395/2/93/179
10 TNA: ADM 106/429/175
11 Kishlansky, p. 291
12 Hughes, p. 232
13 Hughes, p. 237
14 Hughes, p. 172
15 Hughes, p. 174
16 ODNB
17 Wells, p. 58
18 Ravenhill, W.L.D.; Padel, O.J.: *A Map of the County of Cornwall Newly Surveyed by Joel Gascoyne: Reprinted in Facsimile* (Devon and Cornwall Record Society, 1991)
19 Hughes, p. 165
20 Hughes, p. 165
21 Verner
22 NMM: ADM/A/1793 f.293; Hughes, p. 167; www.rmg.co.uk/stories/blog/library-archive-volunteers/great-britains-coasting-pilot-navy-board
23 Chester Archives ZA/B/3/12v
24 Kishlansky, p. 289
25 https://en.wikipedia.org/wiki/William_Stanley,_9th_Earl_of_Derby
26 Hughes, p. 158
27 Hughes, p. 181
28 Hughes, p. 192
29 Hughes, p. 195
30 SP v23 (March 1683)
31 TNA: ADM 106/383/227
32 Caird: ADM/A/1793/294

33 TNA: ADM/18/73
34 Caird: ADM/A/1805/151
35 TNA: ADM 33/165

Epilogue: Turkish Carpets and Silver Watch

1 Burney
2 NRS vol. 60, p. 388
3 NRS vol. 60, p. 405
4 NRS vol. 60, p. 325
5 NRS vol. 60, pp. 149, 188–9, 301
6 BL: Sloane MS 3237
7 Blake, p. 29
8 Hughes, pp. 219–20
9 Hughes
10 Hughes, p. 175
11 TNA: PROB 4 578
12 LMA: MS9664
13 Registers and Books of St Margaret's Church, Westminster: MA/01/01/007
14 Hughes, p. 237
15 Registers and Books of St Margaret's Church, Westminster: MA/01/01/008
16 TNA: ADM 33/165
17 www.british-history.ac.uk/vch/surrey/vol3/pp229-245#h3-s2
18 Caird: ADM A/1819/142

Appendix C: Cartographer's Apprentice: The Young Duke's Plane Chart

1 Howse, p. 11

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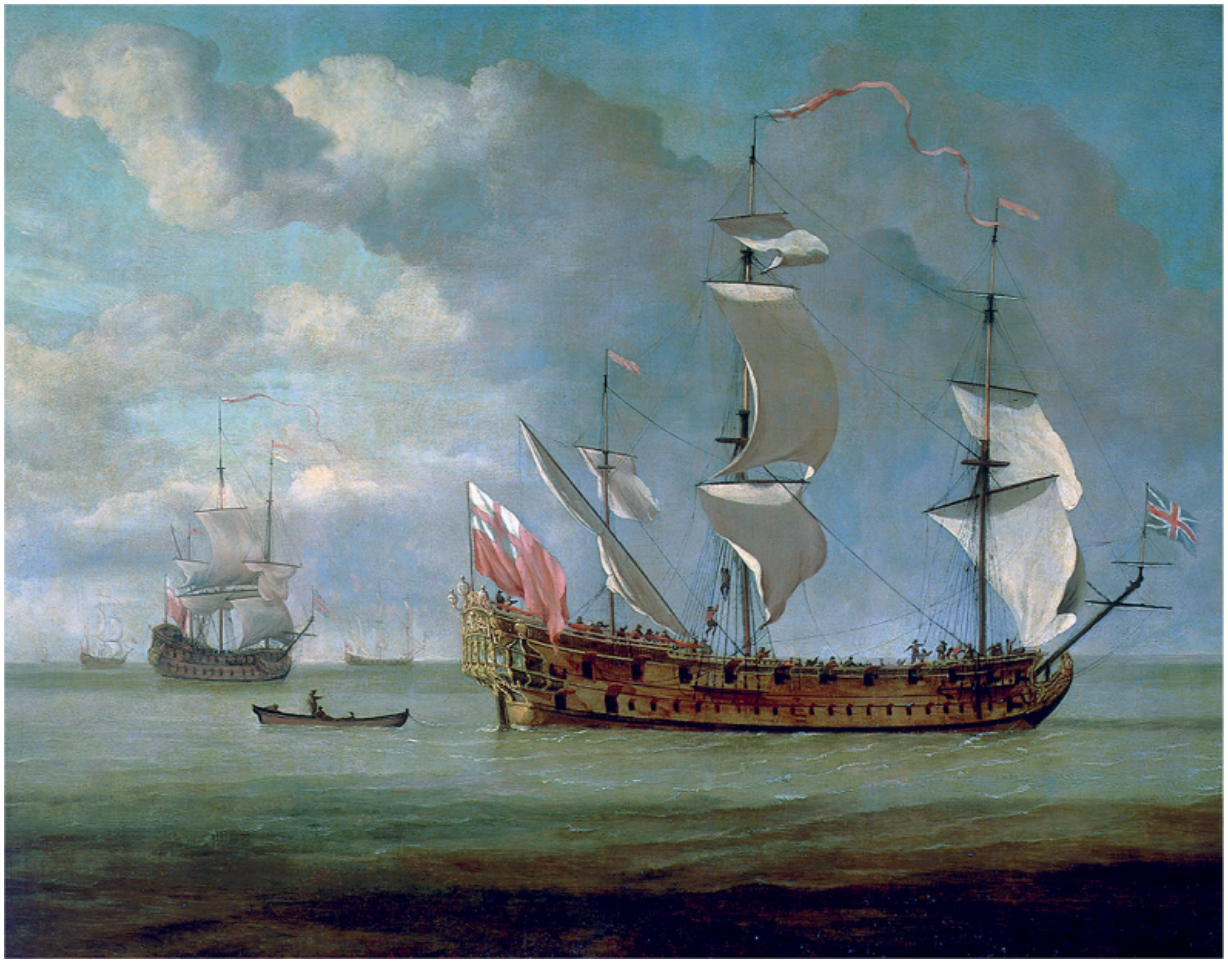
King Charles II at the time of the Restoration, aged 30, who became Greenvile Collins' earliest and most important patron. Portrait by Philippe de Champaigne. (Cleveland Museum of Art)

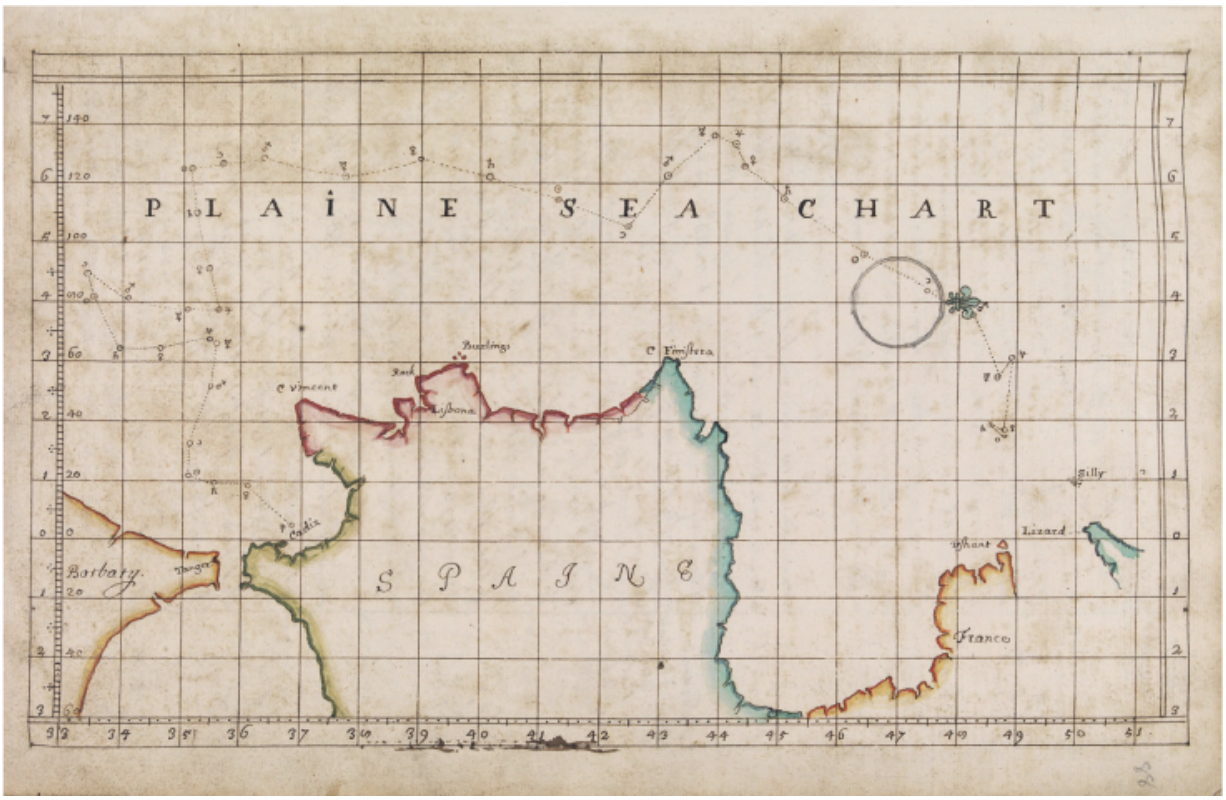


The *Charles* galley frigate, 1677, in which Collins served in the Mediterranean as part of Sir John Narbrough's fleet. Willem van de Velde the Younger. (Alamy, History and Art Collection)

An English ship in action against Barbary corsairs. The campaigning was fierce and bloody, and aboard the *James* galley Collins found himself in the thick of it. Van de Velde the Younger. (Alamy, Art Collection 3)

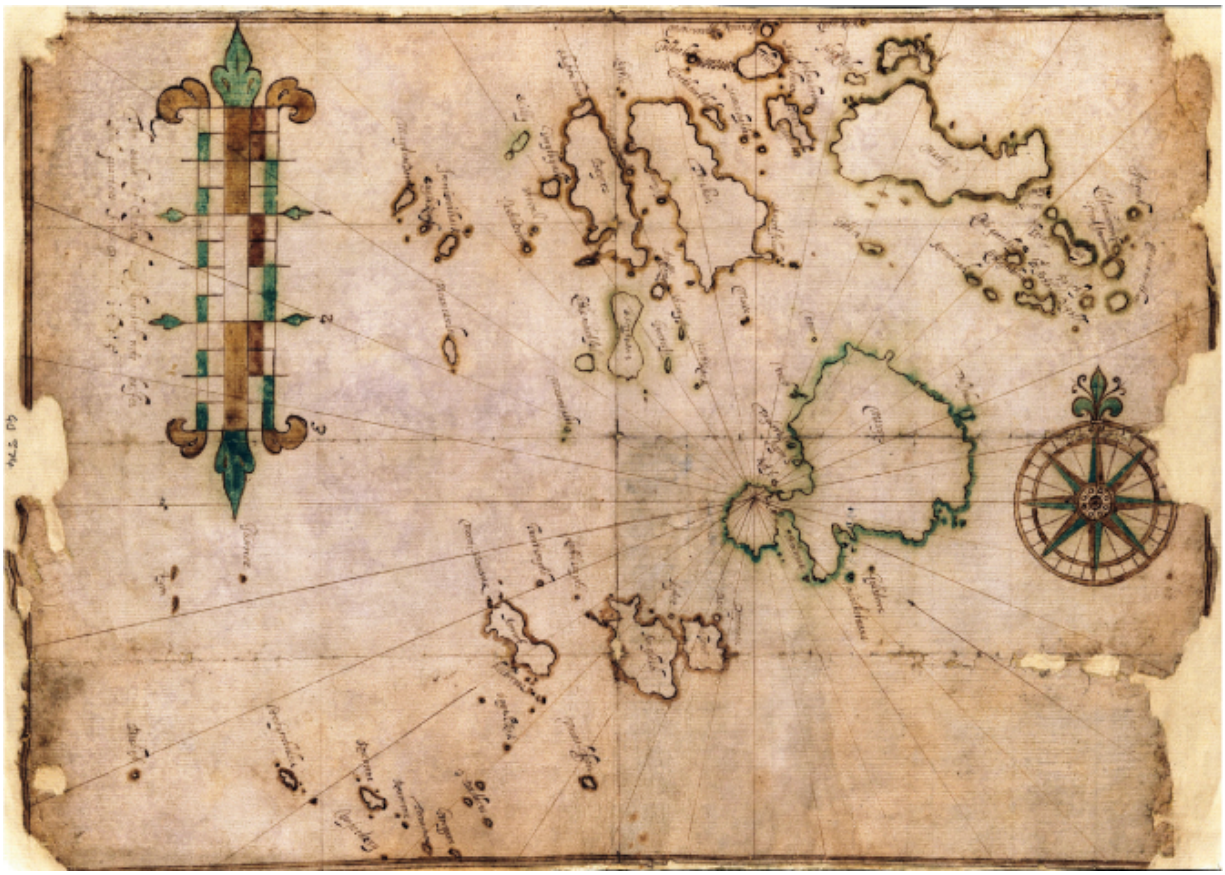
Henry Fitzroy, the first Duke of Grafton. Charles II's seventh illegitimate child became Collins' navigation pupil aboard the *Leopard* in 1680, aged 16. Studio of Sir Peter Lely, 1679. (Alamy, incamerastock)

An irascible but effective naval commander, Sir John Berry was Collins' captain in the *Leopard*. Eight years later he was conspicuously absent from the English fleet's efforts to repel William of Orange. (Alamy, Danvis Collection)



The teenage Duke of Grafton's plot of the *Leopard*'s return voyage from the Mediterranean – colourful, flamboyant and very far from accurate. (Llyfrgell Genedlaethol Cymru – The National Library of Wales)

John Narbrough was an exceptionally able sea officer. Beautifully drafted and packed with information, his superb survey of the Magellan Straits, with which Collins assisted, fuelled the young man’s ambition to be a scientific hydrographer. (Alamy, piemags)



The Godolphin military map of the Scilly Isles from the 1650s, which Collins almost certainly studied. (From the collections at Kresen Kernow GO/974)

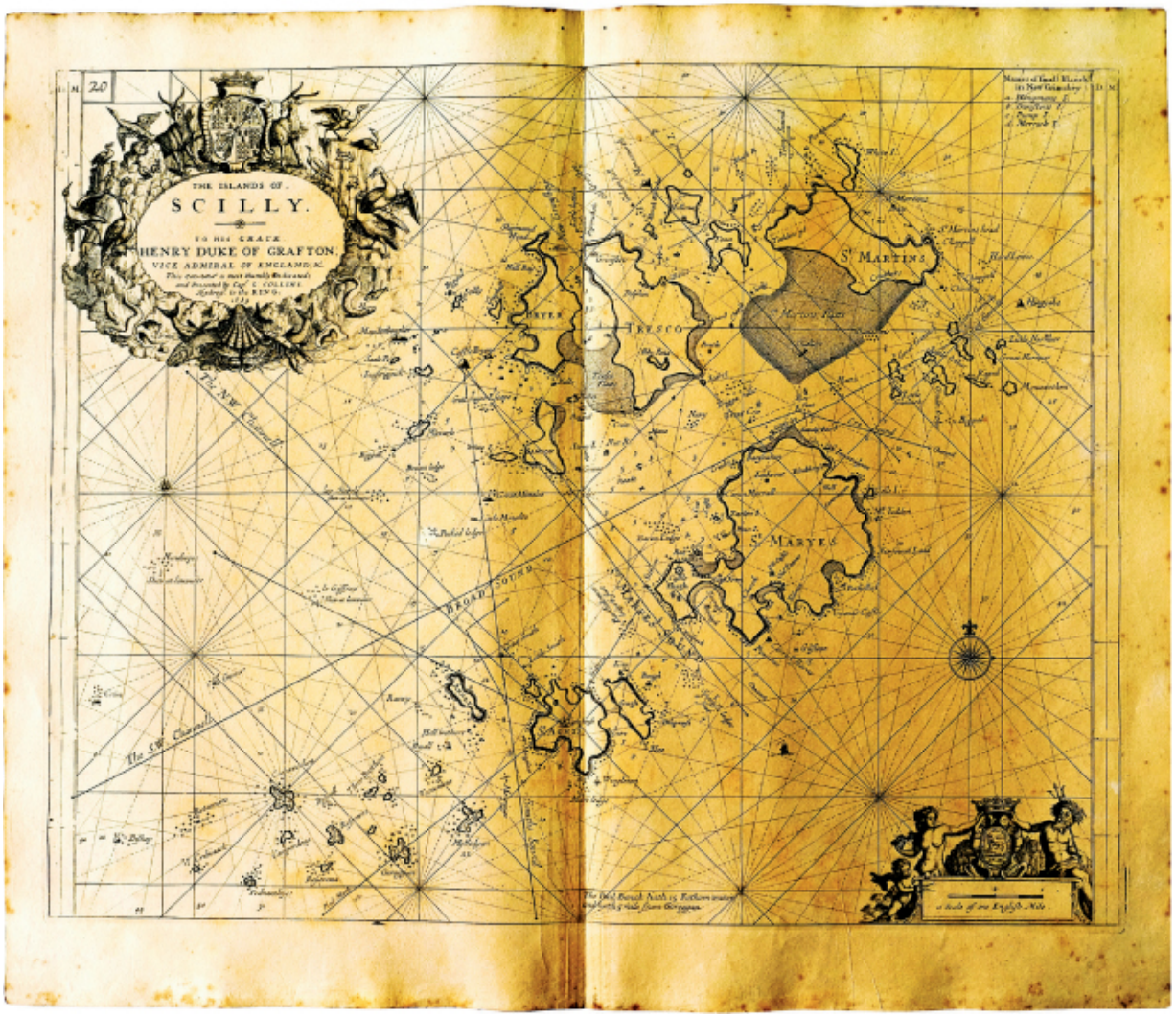


Chart 20 in Collins' great sea atlas, the Isles of Scilly – a cartographical masterpiece with a riddle at its heart – that he dedicated to the Duke of Grafton. (Courtesy antiquemapsandprints.com)

Well meaning and courteous, but hopelessly out of his depth as a fleet commander, George Legge, Baron Dartmouth, had total faith in Collins' navigation and seamanship. (Alamy, ART Collection)

HMS *Resolution* – the English flagship during Dartmouth's doomed attempt to repel William's forces. Collins was her navigator, and helped ensure the navy's failure. Van de Velde the Younger. (Alamy, Pictures Now)

Detail from the Bristol Channel chart, showing the king's return from Ireland. The pointing figure in the yacht is no doubt Collins himself. (British Library)

The hand-coloured opening pages of the magnificent 'king's copy' of Collins' sea atlas, an early impression of the original 1693 edition. (British Library)

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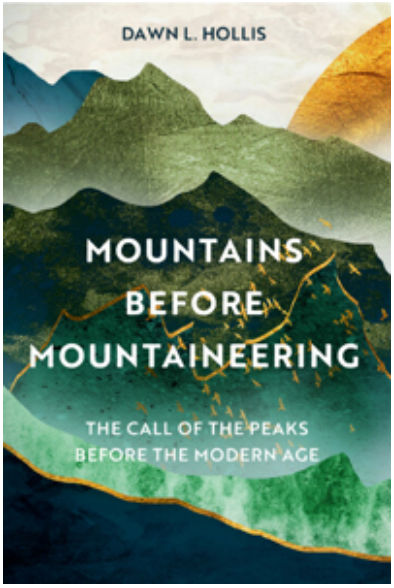
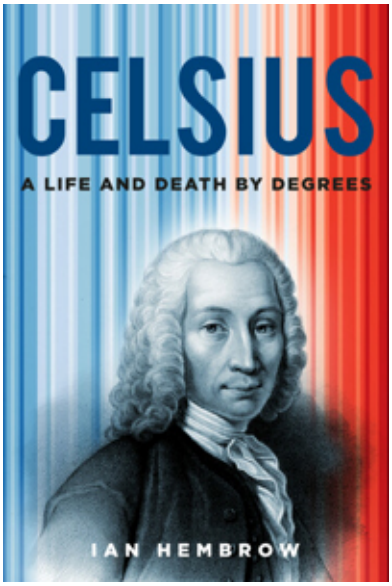
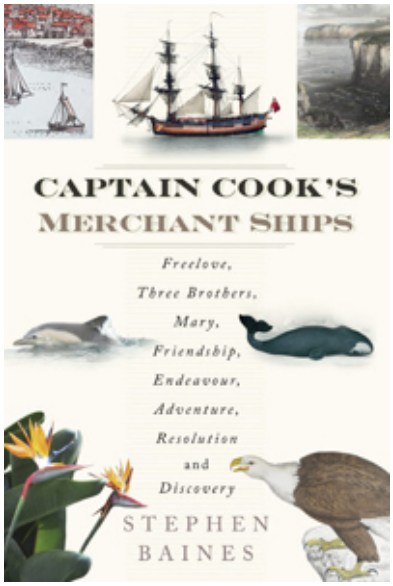
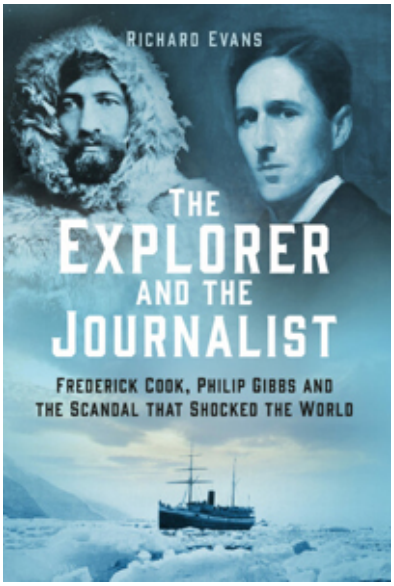
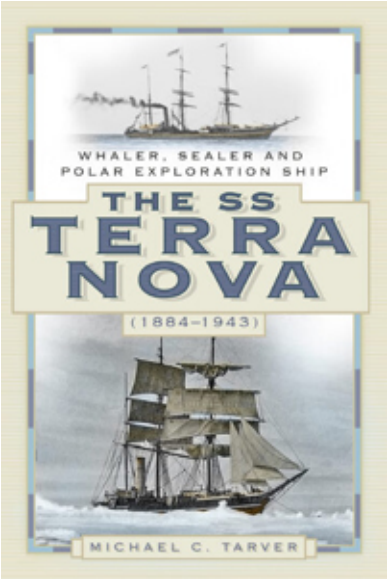
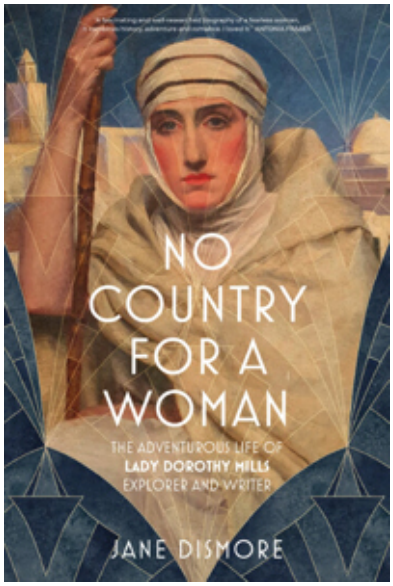

DAWN L. HOLLIS
MOUNTAINS BEFORE MOUNTAINEERING
THE CALL OF THE PEAKS BEFORE THE MODERN AGE

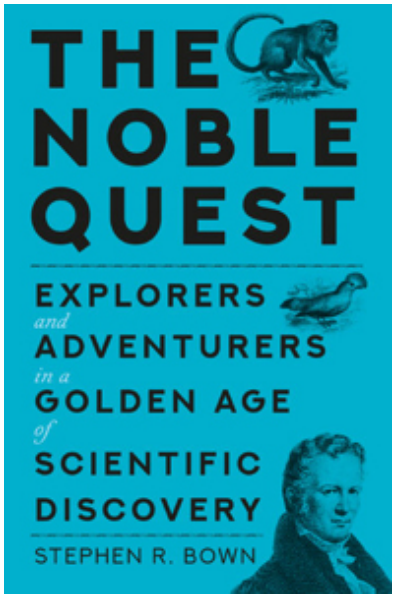

CELSIUS
A LIFE AND DEATH BY DEGREES
IAN HEMBROW


CAPTAIN COOK'S MERCHANT SHIPS
Freelove, Three Brothers, Mary, Friendship, Endeavour, Adventure, Resolution and Discovery
STEPHEN BAINES


RICHARD EVANS
THE EXPLORER AND THE JOURNALIST
FREDERICK COOK, PHILIP GIBBS AND THE SCANDAL THAT SHOCKED THE WORLD


WHALER, SEALER AND POLAR EXPLORATION SHIP
THE SS TERRA NOVA
(1884–1943)
MICHAEL C. TARVER


NO COUNTRY FOR A WOMAN
THE ADVENTUROUS LIFE OF LADY DOROTHY HILLS EXPLORER AND WRITER
JANE DISMORE



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